THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 FEBRUARY, 1935 No. 5

INDEX TO CONTENTS

Wood Flour in Rubber Compounding 227
By Harvey C. Jack

Rubber in the 1935 Automobiles 229
By M. E. Lerner

Controlling Fabric Unrolling 232

Koroseal—A New Plastic Material 232

Application of Latex to Paper Fibers 233
By H. B. Townsend

Rubber in the New Flying Yankee 234

Halogenated Rubber Products 235
By Frederick Marchionna

Royle Model Shows Improvements 237

Age-Rite HP—Flex Crack Resister 237

New Goodyear "Double Tube" 237

Current Technical Developments 238

New Equipment Section 240

REGULAR DEPARTMENTS

Late Domestic News	243	Editorials	242
Financial News	252	Chemical Markets	255
Book Reviews	241	Statistics	256
New Goods	253	Market Place	260
Names in the News	246	Advertising Index	264
Rubber, Cotton Markets	254	Classified Ads	263

THE RUBBER AGE, published on the 15th of each month by the Palmerton Publishing Company, Inc., at East Stroudsburg, Pa. Editorial and Advertising offices at 250 West 57th Street, New York City. Established 1917.

Entered as Second Class Matter, October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879.

Subscription Rates: Domestic, $2.00 a year; Canada, $3.00; Foreign, $3.00. Single copies, up to 3 months old, 25 cents; over 3 months old, 50 cents.

Telephone: COlumbus 5-2923, 5-2924.

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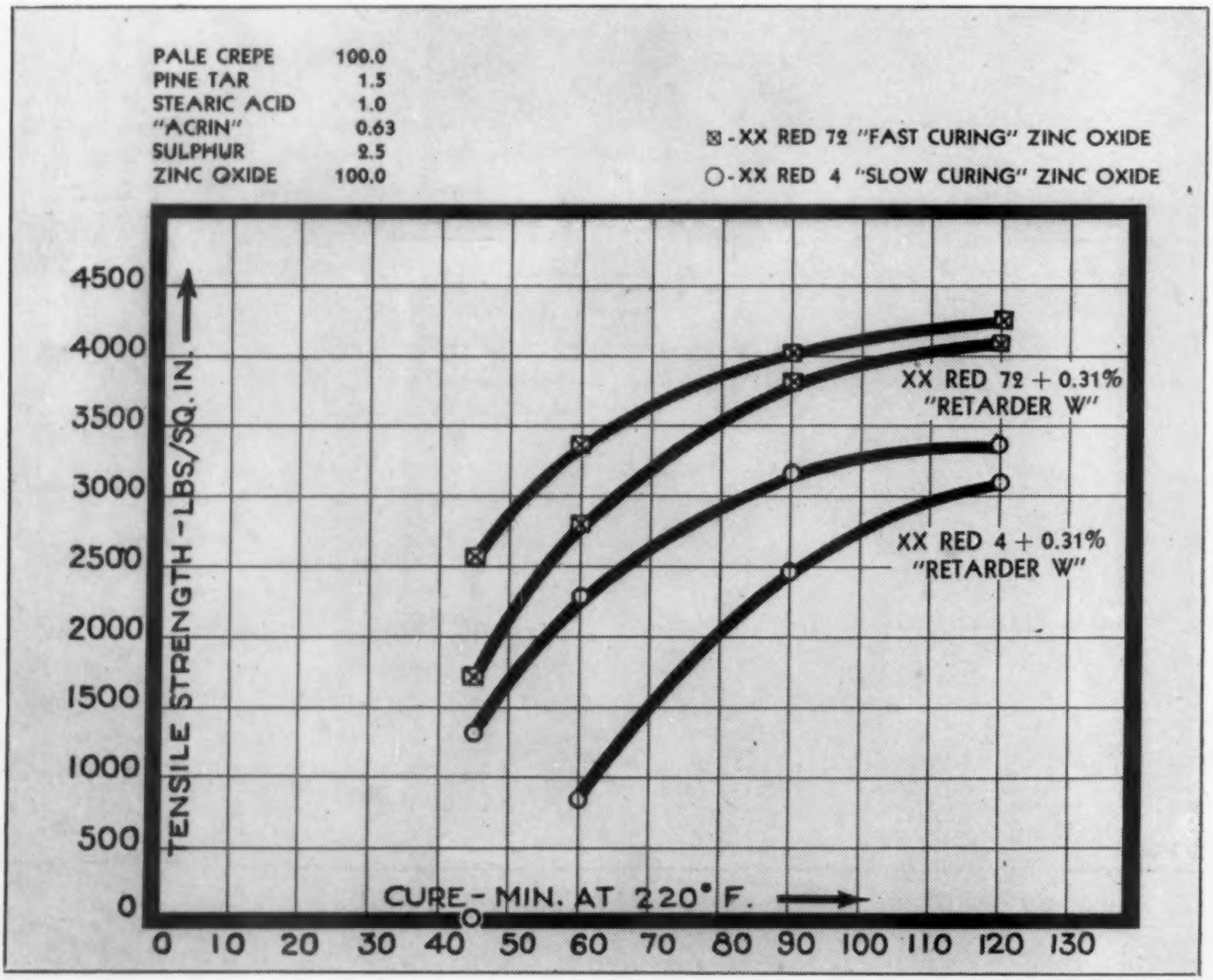
THE EFFECT OF "RETARDER W"

"Fast-curing" XX Red 72 with "Retarder W" is not as "slow-curing" as XX Red 4 without the retardant.



No. 35 of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.

New Jersey zinc

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET, NEW YORK

THE RUBBER AGE

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 36 FEBRUARY, 1935 No. 5

The Growing Importance of Wood Flour in Rubber Compounding

By Harvey C. Jack
President, Wood Flour, Inc., Manchester, N. H.

WOOD FLOUR is wood in a finely pulverized form. It differs from wood only in its physical state; chemically it is the same. It is a combination of the physical and chemical nature of the product which makes it adaptable to the rubber industry, as well as other industries. It possesses qualities which lend themselves to compounding with rubber, often at a lower cost than the material it substitutes, and makes for a better finished product.

After the raw material for making wood flour receives a primary reduction it is stored in a silo, such as the one illustrated, prior to final grinding operations. In the foreground tiers of raw material are seen neatly stacked.

For the past several years wood flour has engaged the attention of rubber chemists. In many instances such experiments as have been conducted have led to the inclusion of wood flour in the production of rubber goods. Because of this interest it is fitting that a general understanding of the product and its characteristics should exist in the rubber industry. It is the purpose of this article to further such information as is available.

Wood flour has a very high dielectric strength, a quality essential in a multitude of rubber compounds, and objectionable in none. Due to its individual particle makeup it is capable of imparting considerable physical strength to completed compounds. The individual particles, nearly atomic in size, are not uniform and are fibrous in nature. Variation in size and fibrous nature of the pulverized wood permits the particles to effect a smooth, inter-locking bond when compounded, the result being a fine surface on the finished product.

The advantages of wood flour as a combining agent are found in both the physical and chemical nature of the product. Physically, it is a fine, amorphous material. This permits easy physical union with other substances. Chemically, the natural resins inherent in the wood aid in the union. Another key to its ready fusibility with other substances lies in its low ash content. Still another is found in the neutral nature of wood flour, an important factor in permitting its use in compounding.

These advantageous characteristics of wood flour result in the practical disappearance of its individual nature

when used in conjunction with other materials. A finished rubber product may contain more than 50% of wood flour by volume and yet give no outward indication that wood flour has been used in the process. A perfect bond has been obtained and the completed product retains in it the original desirable qualities of wood flour, as well as those of the material with which it has been compounded.

Wood itself is a very light material, relatively. When manufactured into the form of wood flour the latter acquires the characteristic of bulk. This characteristic can be measured and its effect on the finished product may be gauged. Referred to as the "bulk factor" it is determined by the amount of volume occupied by a given weight of wood flour under any specified pressure. Compared with practically any other material wood flour will possess a greater "bulk factor." That is, wood flour will be found to occupy more volume for the same weight and pressure than other materials. This characteristic has particular significance in pressure molding, since lighter weight is often directly concerned with quality depending upon the product and its market.

In its original form wood is composed of cellulose, lignin and various natural resins. The involved chemistry of these compositions has as yet been only partially explored. Greater use is found for these substances as new chemical break-downs are discovered, two recent examples being rayon and transparent cellulose. As with the wood itself, cellulose, lignin and natural resins compose the greater part of wood flour. The proportion of these three substances varies with the different species. This is most clearly evidenced by the difference, for example, between Oak and Pine. One is hard, one is soft, and they differ in physical strength. The difference between these two woods is largely physical, since both are composed of the same original materials. The size of the individual cells varies between species as well as the thickness of the cell walls. These factors have a vital effect upon the ultimate character of the wood flour. Due to these characteristics few species are completely satisfactory in the manufacture of wood flour.

In order to secure wood flour suitable for use the original raw material must be subjected to several grinding operations. Still other measures are necessary, including careful screening, to insure absolute uniformity of the finished product. Various woods are used with White Pine by far the most important. Final grades of wood flour are classified according to screen analysis. The rating is on the basis of the coarsest part of any particular grade. For example, our 60 mesh wood flour would analyze as follows:

Retained on 60 mesh	1.0%
Retained on 80 mesh	6.2%
Retained on 100 mesh	27.7%
Through 100 mesh	65.1%

The size opening in the screens used are 60 mesh—.0098 inches; 80 mesh—.0070 inches; 100 mesh—.0059 inches. Further differentiation in particle size is obtainable, finer than 100 mesh, the finest passing through 300 mesh. Grades that are 80 mesh, 100 mesh and 300 mesh are available. Where an extremely fine finish is desired grades of wood flour finer than 60 mesh are used.

In its finished state wood flour has a very low ash content. The ash content is determined by placing a sample of wood flour in a porcelain crucible and leaving the vessel in a muffle furnace for 16 hours at 600° C. By weight the residual ash will be a maximum of ¾ of 1% of the original sample. All elements other than those composing the natural cellulose, lignin and resin compositions of the original wood flour are present in this remaining ash. Manganese, up to 3/1000 of 1%, has been isolated in this ash. Iron is not normally present in any quantity exceeding that of manganese. The presence of any element foreign to those composing the natural wood substances would have to be a small proportion of the ¾ of 1% ash content. As illustrated by the manganese content of the ash, the amount of any additional element is infinitesimal in quantity.

In summing up the advantages of wood flour we may include its dielectric strength, which adds physical strength to the compound; its low specific gravity, which imparts lighter weight to the finished product; its high bulk factor, giving greater coverage; its ready fusibility; its low ash content; and still others.

It is obvious that the inclusion or substitution of wood flour in any already functioning process must be accompanied by definite improvements over the previous formula and the resulting product. Many of these possible improvements are outlined above. But the primary benefit obtained by working with wood flour lies in its economy and the economies it makes possible. The initial cost is lowered due to the comparative prices of wood flour and rubber. Its ability to produce a lighter finished product reduces further costs. It is generally lower in cost than compounding materials it replaces. But wood flour is not

LEFT: Exterior view of collecting and conveying system used by Wood Flour, Inc. Drag and lift conveyors play an important part in transmission of the product but the major role is that of the air system illustrated here. RIGHT: The reducing machine, the first step in making wood flour.

to be considered merely as a cheap substitute even in the light of these cost advantages. Its material advantages overshadow the latter considerably.

Wood flour may be used in the production of a wide variety of rubber goods, among them being rubber footwear, flooring, hard rubber of all kinds including the modern hard rubber battery container. Current research will probably extend these uses considerably. The most common grade of wood flour used in the rubber industry is the 60 mesh. A 50 mesh grade may be used but it is not recommended if a perfect finish is required. Where most exacting results are essential still finer grades should be used.

From a cost standpoint the finer grades are, naturally, higher in price varying with their exact specifications. The important factor in considering the use of wood flour in rubber compounding is the selection of a grade that will function properly. Although some grades and types of wood flour are suited only to certain specific uses other than the compounding of rubber there are several definite grades available that have proven satisfactory for such purpose based on continual use.

It may be interesting to users, and prospective users, of wood flour to learn that the current production rate of producers in the United States is approximately 50% of normal capacity. This condition assures an adequate supply at all times. Economic factors involved in the price situation indicate a continuance of present day prices with any change tending to improve the position of wood flour favorably to the user. Although the tonnage now consumed is considerable it is reasonable to assume that a material increase will obtain for the next several years.

Rubber in 1935 Automobiles

Annual Symposium Reveals Further Uses of Rubber In Automobile Construction With Several New Features

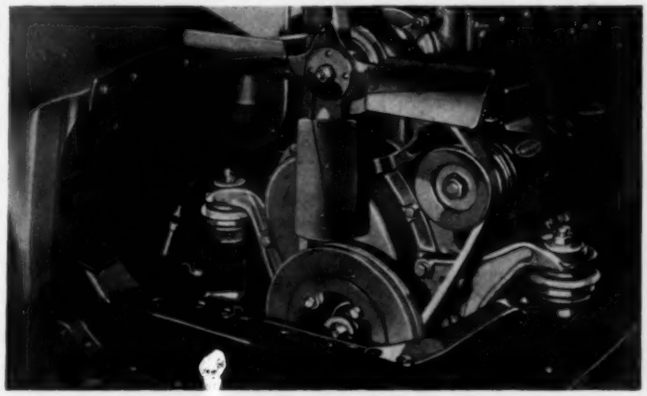
By M. E. Lerner

EVER since the fantastic rise of the automobile industry an answer has been sought to the moot question as to whether the rubber industry deserves the greater portion of credit for the success of the automobile or whether the automotive industry "made" the rubber trade. True, the one is dependent upon the other, but certainly one or the other merits the greater credit by a shade. Perhaps the answer is to be found in a recent statement by Charles F. Kettering, General Motors executive, believed by many to be the outstanding automotive executive and engineer of the day. Mr. Kettering, in a statement reproduced elsewhere in connection with this article, stresses the point that irrespective of the bodies, engines or fuels now available the motor car industry would still be a mere protege without the pneumatic tire.

Mr. Kettering doesn't go far enough, in our opinion. Each year brings new announcement of improved cars from the standpoint of speed, style and convenience in riding. Many, if not most, of these improvements are made possible by new rubber applications. For several years past THE RUBBER AGE has presented an annual symposium on these rubber developments. This year's analysis reveals further proof of the specific part played by rubber in the automotive industry.

Practically every 1935 major make automobile utilizes rubber engine mountings. Dodge cars use rubber in their "floating power" front mounting dash. Oldsmobile's tri-cushion engine suspension uses rubber engine mountings bonded to steel forms. Cadillac motors use rubber as engine supports at five separate points. Chrysler, Plymouth, Reo, Willys, and Packard, are a few other makes that standardize on rubber mountings as engine supports. The day when motor car engines were rigidly attached to the chassis is definitely gone.

The recent automobile show held in New York City revealed some interesting facts concerning the use of rubber in cars. For instance, when quizzed on the number of rubber applications used in the new Airflow De Soto, product of Chrysler Motors, engineers advised that there were more than 300 of such applications in the construction. The Dodge models, it was revealed, use 56 rubber parts in major applications with dozens of additional spots making use of rubber to a less important degree. The "Synchromatic" front suspension of the new Dodge uses rubber at 20 separate points.



Rubber mountings as engine supports are now standard equipment on the Reo line for 1935.

As an example of the use of rubber in new lines of cars, the Oldsmobile 1935 models make use of almost every known new application and may be regarded as examples paralleling the finest construction jobs in the automotive field. An analysis of major rubber applications in this line reveals the following uses:

Engine Mountings: as described above the tri-cushion engine suspension uses rubber engine mountings bonded to steel forms.

Cowl Ventilator: effectively shielded from leakage by a rubber gasket.

Steering Wheel: made of hard rubber shaped around a steel core for greater safety.

Trunk Racks: all models equipped with built-in trunks protect their contents by a sponge rubber seal.

Running Board: made of rubber bonded steel; the rubber mat extends up from the inner side of the running board from lower body panels.

Fenders, Radiators and Headlamps: all of stabilized design, the entire assembly being pivoted on a block of live rubber placed in the center of the front cross member.

Brake System: super-hydraulic system uses rubber in several applications particularly in rubber tubing from the hydraulic lines to the cylinders and in the rubber cups of the wheel cylinders themselves.

Knee-Action: uses rubber cups at the upper end of the coil springs.

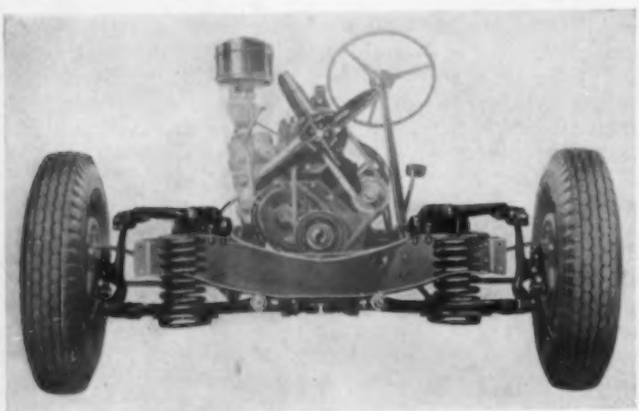
It is most interesting to note that Oldsmobile advertising on the 1935 line is stressing ten features of design and construction. These features are those listed above, every one of which incorporates the use of rubber. Although many of these applications have been in use for several years many new applications will be noted in the listings.

Vibration dampeners of the "biscuit" type have been adopted this year by many of the leading automobiles. Among other types using this rubber application is the Reo line for 1935. F. L. Edman, of the Reo Motor Car Company, Lansing, Michigan, also sends us a list of other applications of rubber on the new line, which include the following:

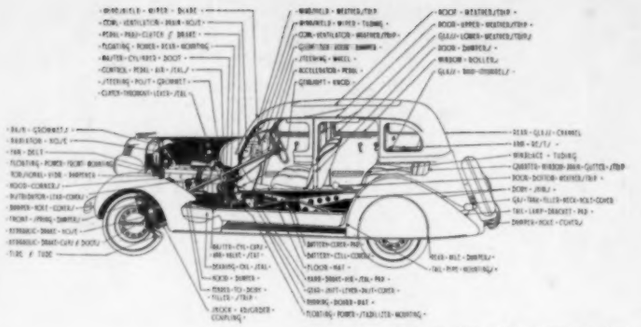
Motor vibration insulating mounting discs, shock absorber insulator bushings, spring to axle insulator, grommets at various points, tubing, door bumpers and checks, door seals (water and wind), cowl ventilator seal and drain tubes, windshield glass seal, hood bumpers and guards, battery box cases and plate separators, floor mats and carpets, tail lamp pads, running board covers, running board to fender joint seals, axle bumpers (front and rear), steering wheel, tie rod ball joint dirt seals, radiator hose, dash grommets and windshield wiper vacuum line tubing.

As optional equipment in deluxe models Dodge offers purchasers an automatic clutch boot made of rubber. Included among the 56 rubber applications on the 1935 Dodge chassis are such as front spring silencer, pedal pads on clutch and brake, torsional vibration dampener, distributor lead covers, hood corners, gearshift lever dust cover, gearshift knob, gas tank filler and fan belt. The Dodge cars also utilize rubber for the arm rests in connection with rear seats.

Cadillac's 1935 line of models use rubber in approximately 72 major applications. Special uses of rubber in connection with this higher-priced line include sponge rubber foot rests and hassock padding, sponge rubber arm rest padding, and floor board insulators. In its electrical and lighting system Cadillac employs rubber in 9 separate spots, i. e. in the battery and leads, battery box fillers, wires, insulators, grommets, horn projector grommet, horn mounting bracket insulator, lamp bracket pads and in the ignition lock cable retainer.



Knee-Action on the new Oldsmobile models incorporates the use of rubber cups at the upper end of the coil springs as depicted here.



Drawn for THE RUBBER AGE

Chrysler's 1935 automobiles make liberal use of rubber as illustrated by this drawing of a Chrysler (Airstream) Six.

Three applications are found in connection with the Cadillac steering wheel, these being the steering wheel rim, steering column support pad and steering column grommet. The clutch and transmission system uses rubber in four places: pedal cover, gear shift lever knob, pedal stop and rubber is compounded in the clutch facing. Nine additional rubber parts are used in Cadillac engines, viz: crankshaft balancer, pipe insulators, gasoline and vacuum pump diaphragms and gaskets, wiring and insulators, distributor high tension wire nipples, engine supports (at 5 separate points), accelerator pedal stop, carburetor intake air hose and air cleaner gaskets.

With regard to the use of rubber in the "Airstream" models now being featured by the Chrysler Corporation the chart reproduced in connection with this article showing rubber applications in a Chrysler Six is self-explanatory. A glance at the chart will indicate the liberal use made of rubber in this instance. It is used in almost every conceivable spot where it is applicable. Here again rubber is used in the rear seat arm rests for passenger comfort. Weatherstripping is utilized in connection with the roof, door windows, window separating the inner compartments, rear window, around the doors at top and bottom, around the windshield, and at other specific points.

Chrysler's famed "Floating Power" system uses rubber for both front mounting and stabilizer mounting. The engine makes use of rubber as a torsional vibration dampener, hood covers, distributor lead covers, bearing oil seal, battery cover pad, gear shift lever dust cover, etc. The outer rear of Chrysler models also make good use of rubber the gas tank filler neck hole cover being of rubber construction. Other parts of the rear using rubber include body shims, bumper hole covers, tail lamp bracket pads, rear axle bumpers and the tail pipe mountings.

Among the other leading automobile manufacturers we are advised by F. H. Kane, assistant to the Chief Engineer, Pontiac Motor Company, that "outside of the usual rubber parts which we have used for some years and which we believe you are acquainted with, we have a few new applications which were made the subject of patent applications."

John M. Bonbright, of the Technical Publicity Department, Chevrolet Motor Company, another General Motors branch, informs us that in checking the new models to ascertain new installations incorporating rubber he determined that "rubber is used in places where it was used before, but none of these installations represents any innovation, but merely a further extension of previous practice."

Chevrolet, of course, is a large user of rubber. The parts books of the company, covering the chassis alone and excluding parts supplied by Fisher Body, carry more than 500 parts numbers for articles made of rubber or using rubber in their construction. Many of these parts, such as various grommets, are used in several places in each chassis. The total of 500-odd parts includes their use on all models produced by Chevrolet, the two-passenger car chassis and the ½ ton and 1½ ton truck chassis, and not any one particular model.

The Studebaker Sales Corporation of America, selling agent for Studebaker models, whose now-famous slogan "From the Speedway Comes Their Stamina, From the Skyway Comes Their Style" is making radio history, has developed rubber applications in the past few years without the use of any new startling innovation. A chart indicating rubber applications on the new Studebaker models shows 61 major uses including front motor mounting, power cylinder anchor bracket, grommets, accelerator pedal, foot pedal, floor mat, hand brake air seal pad, front floor board, power cylinder boot, and similar uses.

From the above it is evident that no startling development in connection with rubber appears on the 1935 cars. There have been several new applications since we reviewed last year's models but most of these have been in passenger convenience and riding comfort. Rubber pads for pedals are more evident than formerly. Use of rubber for engine mountings has spread to almost all car models in every price range. It is safely estimated that the use of rubber applications in the modern automobile, outside of tires and tubes, almost equals in combined weight that of the latter uses. In former years estimates placed such weights as 70% for tires and tubes, the 30% balance consisting of other uses.

Tires and tubes absorb the first shock when motor cars travel on hard, bumpy roads, with the spring absorbing the balance of shock. The modern automobile has a layer of rubber between the axle and spring to help absorb this shock. Automotive engineers state that the future will see the entire removal of the spring in favor of a rubber application of some sort. They also predict a rubber mounting between the motor and the running gears of the car and between the gear box and the wheels.

The possibility of all-rubber fenders and rubber upholstery on the interior is still in the experimental stage. In the latter case English motor car manufacturers have gone further than American concerns. The Darracq Motor Engineering Company, Ltd., of England now uses rubber for seatings on their Talbot line of cars. (See September, 1934 issue, THE RUBBER AGE). Talbot cars also make use of rubber slatting as a baseboard for seats replacing the accepted canvas webbing type. As optional equipment purchasers of these English-make cars may have rubberized hair, cellular rubber or pneumatic cushions.

What the future automobile will be only time will tell. Streamlining seems to be only the first step in a complete revolution in design and construction. But, in any event it is safe to state that irrespective of the outward appearance of the automobile rubber will continue to play a major role in its construction.

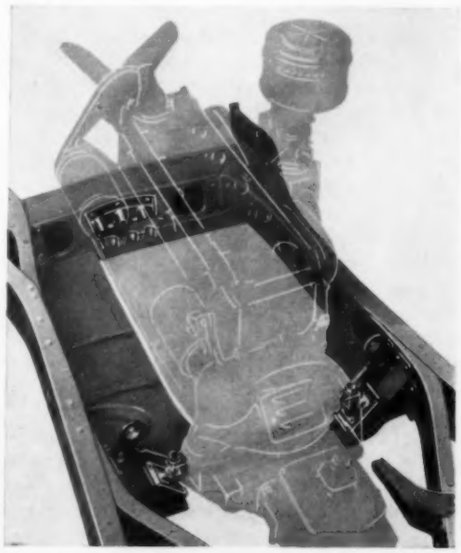
"Rubber Makes Motor Cars Possible"

Statement in a recent address by Charles F. Kettering, vice-president, General Motors Corp.

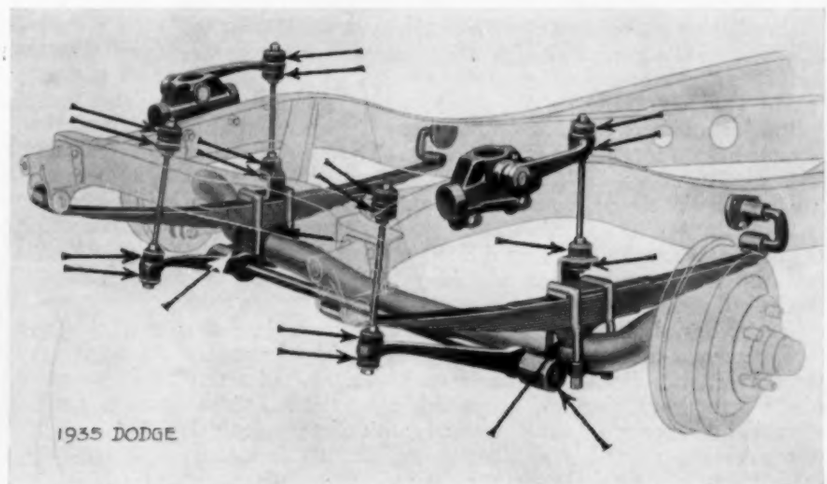
The automobile industry isn't simply the product of a single large industry, it is the product of many industries. It moves ahead as a result of new discoveries and developments in the rubber industry.

I do not believe many of us recognize that the pneumatic tire is the one and all important thing that has made the motor car industry. I have always wondered just exactly how Dunlop's neighbors listed him when he proposed to fill a tube full of air and roll it on the ground when nobody up to that time had ever seen anything but an iron tire in contact with the earth. And yet that very simple notion is the thing that makes possible this enormous transportation system which we call the motor car industry. Without it, it would not make any difference what kind of bodies, engines or fuels we had —without the pneumatic tire it would be impossible to have a high speed motor car.

Until a few years ago, trucks used solid rubber tires, and they had to crawl along the highways. Today they use pneumatic tires, and because these tires are now practical for trucks, truck engines are now built to drive a truck at approximately the speed of a passenger car. The pneumatic tire costs more than the solid, but the man who uses it more than gets his money back in the increased use he gets out of his truck.



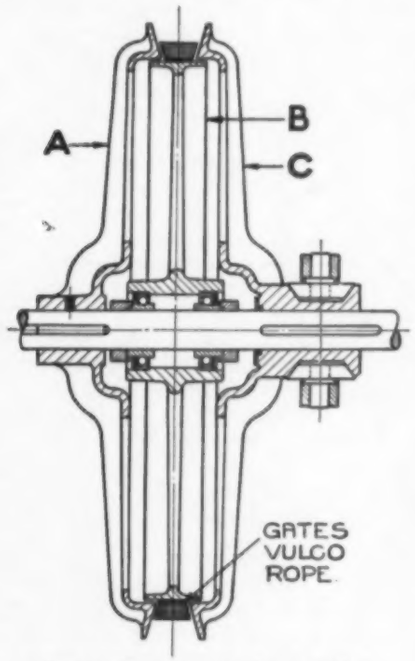
Tri-cushion engine suspension in the 1935 Oldsmobile uses rubber engine mountings.



The Synchromatic front suspension of the 1935 Dodge uses rubber at 20 separate points as indicated by the arrows. The chassis of these models uses rubber at 56 sections.

Drive and Clutch to Control Fabric Unrolling

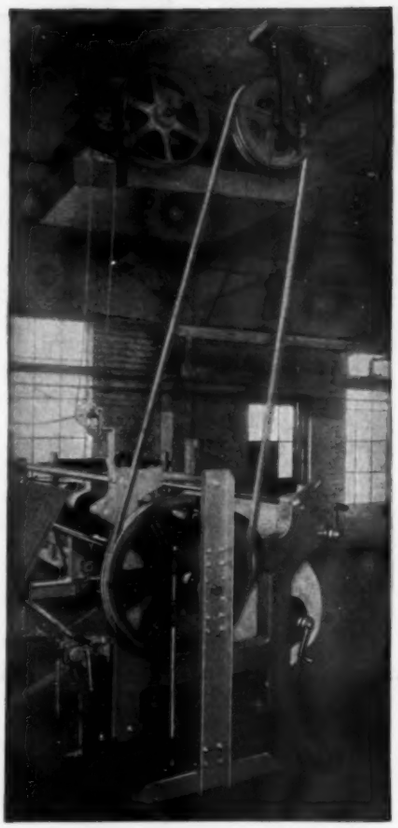
A SIMPLE yet highly effective combination drive and clutch, using simple principles, has recently been developed by the engineering division of the Gates Rubber Company, Denver, Colorado, for use on the unrolling machines which feed fabric to their bias cutters. The following description, reproduced through the courtesy of "The Dragon," house organ of the Fafnir Bearings Company, New Britain, Conn., and using illustrations authorized by the Gates concern, shows the construction of the unit and its method of operation:



Cross-section view showing operating characteristics of drive and clutch.

It will be noted from the cross-section view of the clutch on the left, the flange A is fixed to the driven shaft. The flat-faced pulley B is an idler free to revolve on the shaft. This pulley is equipped with Fafnir ball bearings of the "wide inner ring type," which not only guarantees a freely operating unit, but should conditions demand dis-assembly, make this a simple operation. In addition to the fixed flange and idler pulley the unit also consists of a flange designated as C which is splined to the driven shaft and can be moved in and out by means of a clutch fork operated automatically by an air cylinder.

While this flange is in a dis-engaged position, the V-belt rides on the idler pulley, but to engage the clutch the movable flange is drawn towards the fixed one, thereby raising the belt from the idler and up onto the grooves formed between the two flanges. This action results in a conventional V-belt drive. The driver sheave on the countershaft is adjustable so that the tension in the drive may be regulated.



Vulco Rope drive and clutch in operation on fabric unrolling machine.

Sheffield Installs Vulcalock Equipment

INSTALLATION of Vulcalock equipment at the Vergennes, Vermont, dairy by-products plant of the Sheffield Farms Company, has recently been completed by Goodrich engineers. As a result of the use of this equipment it is said that the dairy concern will reduce its maintenance and breakage charges, will lower repair costs, and due to economies effected will save sufficiently in 18 months to approximately cover the cost of initial installation of the equipment. A description of the installation follows:

The sale of casein, formed by the coagulation of skim milk with muriatic acid, had for many years been an important by-product of Sheffield Farms. The muriatic acid was purchased by the company in carboys which were emptied on the first floor of the plant. Then the acid had to be pumped to the third floor to the casein manufacturing department where it was diluted with water in earthenware crocks and added to skim milk to precipitate casein.

Goodrich Vulcalock equipment was used to replace the carboy system in use. Acid now comes to the Vergennes plant in rubber lined steel tank cars. Instead of being stored in carboys, the acid is passed into a 10,000 gallon storage and pressure tank treated with the Vulcalock system. Rubber lined steel pipes carry it up to the casein department where the operator may draw off the acid simply by opening a Vulcalock valve. Uniformly pure casein is assured since the acid is kept clean at all times from delivery to use.

Koroseal—A New Plastic Material

CONTAINING properties said to be superior to rubber for the manufacture of a number of products, the B. F. Goodrich Company, Akron, has introduced a new plastic material under the trade name of Koroseal. Although technical details on the new material have not yet been made available, Goodrich engineers claim that it may be molded into any shape, resists the actions of various chemicals injurious to natural rubber, and possesses even greater flexing strength than rubber.

Different from rubber in chemical composition Koroseal, like rubber, may be varied by compounding methods from very hard to soft, doughy consistency. It can be produced in a variety of colors, and is odorless. The resistance of the new plastic material to swelling when exposed to many oils and greases and to disintegration in the presence of corrosive chemicals is said to be unusual. It also resists the action of chromic acid and hot, concentrated nitric acid. Tests show it to be suitable for a piston packing because of the tight seal around the piston afforded by the compound in the presence of oil.

Another use for Koroseal is in molding ornamental plaster casts because of its resistance to moisture and stability over a wide range of temperature. Other resistance qualities of the product include light and oxidation.

Goodrich engineers state that the prohibitive cost of manufacturing Koroseal precludes its adoption as a general substitute for rubber, but maintain that some of its characteristics render it far superior to rubber for certain specialized applications.

The Application of Latex To Paper Fibers

A Discussion of the Three Known Methods of Incorporating Latex in Paper Prior to, During and After Sheet Formation

By H. B. Townsend

Vultex Chemical Company, Cambridge, Mass.

Appearing before a joint meeting of the New England Section of the Technical Association of the Pulp and Paper Industry and the Connecticut Valley Division of the American Pulp and Paper Mill Superintendents Association at Springfield, Massachusetts, on December 8, 1934, the author delivered an address on the applications of rubber to paper fibres. Because the paper reviews the current developments of latex in the manufacture of paper we are publishing the address herewith, omitting only a few paragraphs which covered the nature of rubber, its sources, vulcanization, etc.—all of which is well known to our readers.—EDITOR.

ALTHOUGH rubber is one of our commonest engineering materials and one which is a decided function of our daily life, the true value of rubber is greatly underestimated. We have seen some organizations, recognizing the nature of the problems connecting rubber with paper fibers, that have solved the difficulties and have in the past four or five years produced and sold tons of rubber-fiber products. This success has been obtained after the previous discouragements of a decade or so ago when tests with rubber proved unsuccessful.

It is my purpose to review, without prejudice as to what forms of rubber may be concerned and the general state of the art as it exists today. Many of the processes, materials, or combinations that I will discuss are the bases of patents. However, for the sake of brevity we will forget any patent complications in this review.

Rubber may be incorporated with paper fibers by three distinct processes to give a homogeneous rubber-fiber sheet formation. These three basic processes, capable of numberless variations, are: (1) incorporation of rubber prior to sheet formation; (2) incorporation during sheet formation; and (3) incorporation of rubber after sheet formation.

Methods For Incorporating Rubber

The first method is commonly called the "beater process." Here the fiber in its customary slurry and perhaps only very lightly hydrolized has rubber deposited on it from a latex type of rubber. It may be compounded or added as Vultex and eventually coagulated on and around the fibers by chemical, heat, or mechanical action, in fact, this coagulation of the rubber is somewhat like the coagulation of a rosin size by alum. The slurry so formed is then discharged from the beater and formed into a sheet in the customary manner. In this process it will be observed that the beater merely serves as a means of mixing the rubber and fiber together. Mixing could be done just as well in some other equipment, as for instance, in the stuff chest.

The second method of incorporation would be to apply the latex type of rubber by spraying, dipping, doctor roll, or some equivalent method at the time the sheet is being formed on the machine. Here the rubber must again best be coagulated promptly to avoid contamination of equipment. Coagulation may result due to the presence of alum in the sheet, the acidity of the sheet, or may be brought about by the action of heat or acid fumes.

Position of the Converter

The third method of incorporation is the saturation of the sheet after it has been formed. This method is, of course, particularly designed for those companies who do not manufacture paper but who stand in the position of converters. It is the paper manufacturer, however, who produces a type of stock which will be readily saturated by a latex type of rubber. Here we find that the sheet must be highly absorbent, porous, un-sized, non-acid, and most companies engaged in saturation prefer to use a relatively long fibered stock. Methods of saturation are an art in themselves, and each type of paper may require different methods of treatment. It may be advisable, for instance, to dilute the latex compound, to add penetrating agents to the compound, to initially wet the sheet, apply pressure, vacuum or temperature effects, and uneven speed rolls are also suggested as a means of forcing the rubber into some types of paper. Many of these rather soft, absorbent saturating papers when wet with the water from the latex type of compound have little wet strength. This may be overcome by the use of a special sizing of the paper which is not deleterious to its impregnation rate, or conveyors for the wet sheet may be necessary. Ultimately, the rubber is coagulated, and evaporation of the dispersing phase may serve as the means of coagulating.

The results which may be obtained in the first two methods of incorporation of rubber are twofold. First, we should consider the changes in manufacturing practice which result through the use of rubber as the cementing agent for the fiber, rather than the formation and use of cellulose hydrates. When using rubber as the cementing agent for fiber, there is marked reduction in power consumption. This is due to the fact that it is no longer necessary to hydrate the fiber to secure sufficient bond. It will also be found that a stock containing rubber will have a slowness on the paper machine which gives for a high degree of uniformity in the sheet. There is little tendency for any wildness in a paper stock containing rubber. These advantages reflect a change in manufacturing operations. If a wet machine were to be utilized for the formation of a rubber-fiber sheet, slipping of the

stock on the makeup roll is to be expected, unless adequate removal of moisture from the slow stock is made, probably best by use of additional suction boxes. It would also be advisable to use a more open felt and to clean the felt very thoroughly by the addition of beaters and water sprays to prevent any plugging of this delicate and expensive portion of a paper maker's equipment. It is worthy of note that in the use of vulcanized latex, the tendency for plugging of a felt is decreased. This is because the coagulum resulting when Vultex is used is much drier and has little or no tendency to stick to the felt.

In addition to these manufacturing values, the characteristics of the product obtained should be enumerated. A small amount of rubber added to paper fiber will increase the fold resistance remarkably. The paper has the ability to flex without cracking, and in heavy sheets such as would be produced on multiple cylinder machines or in a wet machine, there will be a marked flexibility to the stock, a high tear resistance, and the ability to hold stitching. Many of these properties are valuable in the shoe industry. The rubber incorporated with the fiber presents a smooth surface after calendering which is excellent for printing. When much rubber is admixed, the product will have a rubbery surface drag, and heavy weight sheets may be built up as a result without the use of intervening cement by plying the sheets under pressure. The stock is also highly resilient and tends to come back into shape after being deformed. It is also possible to maintain a very remarkable porosity so that the paper stock will breathe and at the same time give a maximum protection of fiber against a reaction with reagents which would disintegrate the fiber. Pyroxylin or rubber coatings are frequently used to cover the base stock and give simulated leather appearance.

In almost every case it is necessary, where long life is desired, to convert the rubber at some stage of its processing into the vulcanized form in order to maintain the characteristics of the resultant combination over a wide temperature range, as well as maintain ageing properties. The rubber-paper mixtures, to serve some particular use, may be compounded with numerous materials, many of them already in use in the paper plants, such as rosin or other types of resins, as for instance phenolic resins, asphalts, starches, gums. Wax, softening oils, especially hydrogenated tallows, glycerine, also serve a particular purpose. The addition of stiffening agents such as glue, casein, or mineral fillers, also may be indicated in certain types of products. Coloring ingredients, either pigments or dyestuffs, are also frequently found. Rubber serves a particular value in the combination of mineral loading with paper. This is because the rubber aids in retention of higher proportion of such mineral loading in the paper and decreases the loss of fiber or mineral prevalent when open systems of paper making are used.

Rubber as a Sizing Medium

Rubber is also suitable as a sizing or a coating upon a previously formed sheet. As a sizing medium, the property of rubber with resistance to moisture is very apparent. Properly compounded and vulcanized, the rubber also becomes excellent in its resistance to greases and certain oily materials. The fact that friction coagulates most latex formulations has, however, not readily allowed of the substitution of rubber in the regular stack sizing operation. It would customarily be applied by means of a fountain application, tub sizing, or some type of coating machine.

Rubber is being used as coatings upon magazine papers, one method being to replace in whole or in part the casein used in clay coating work. Here it is claimed that better printing qualities, higher flexibility, and greater resistance to moisture are obtained. Colored rubber formulations may also be used for production of various colored coatings.

The final application which I will mention relates to the use of rubber as an adhesive. Such adhesives are capable of producing flexibility and permanency that cannot be obtained by the use of the customary starches, gums, or silicates. When sufficient amounts of adhesive are utilized, a continuous film of rubber may be obtained over the surface so that a paper product plied together and bonded with rubber may show little moisture passage and a bond so flexible but still so tight that to rip it apart results in destruction of the paper itself.

The old ideas which so many of us have held, due to the unfavorable early experiments with rubber have today been overcome by diligent research. Claims previously made that the early decomposition of rubber in conjunction with woody fibers containing abietic acid or rosin complexes is to be expected, today hazards no real difficulty, for since that time the rubber industry has swung into the use of antioxidants which are capable of protecting against such attack, and paper fibers have undergone processes that remove such deleterious materials. By control of technique, it has also been found possible to regulate the size of the rubber coagulum deposited and to prevent the flocculation or existence of large rubber particles throughout a paper sheet, which formerly caused so much disgust to the paper manufacturer. Although problems are nearly always present in any manufacturing industry, it is my firm belief that as far as rubber and paper fibers are concerned, the time for skepticism has passed. Vulcanized latex has played a prominent part in past developments and will continue to be of service to the paper industry.

Rubber in the New Flying Yankee

LATEST developments in the trend toward higher-speed, lighter-weight streamlined trains is the completion of the New Flying Yankee described as "a self-propelled, three car, articulated high-speed train of light-weight stainless steel." Built by the Edward G. Budd Manufacturing Company, in cooperation with the Winton Engine Division of General Motors Corporation, this train differs from other types in that it was especially adapted for service on the roads maintained for passenger service by the Boston & Maine and the Maine Central railroads.

The New Flying Yankee is a three-section articulated unit, which is to say that there are three sections carried on four trucks. Of interest in the construction of these trucks is the extensive use of rubber insulation to prevent transmission of sound and other high-frequency vibrations to the car bodies. There are rubber inserts under the center plate, in both top and bottom equalizer spring seats and between the ends of the equalizers and journal boxes. The bolster chafing plates are of hardened spring steel but are insulated from the frame by pads of sound-deadening rubber.

At the sides of the center plate are strips of rubberized fabric belt material which take fore and aft thrusts and prevent metallic contact and sound transmission. In addition to the pad under the center plate rubber thimbles are provided around the king pin and the center plate bolts, the latter also including washers. A further precaution against unnecessary noise is the provision of automotive brake lining wherever the members of the truck brake rigging are likely to rub. The New Flying Yankee was first demonstrated on February 5 and made more than 100 miles an hour through falling snow.

Halogenated Rubber Products

By Frederick Marchionna

Author of "Latex & Its Industrial Applications"

WE CONTINUE herewith the abstracts on halogenated rubber compiled by Mr. Marchionna. These abstracts are being brought to the attention of rubber technologists because of the renewed interest in chlorinated rubber in the past few years. It is planned to incorporate this material, at a later date, in book form to supplement the author's bibliography "Latex and Its Industrial Applications." The 40 preceeding abstracts will be found in the November and December, 1934, and January, 1935 issues of THE RUBBER AGE.—EDITOR.

41.—Ellis; U. S. Pat. 1,695,638; Dec. 18, 1928; *Chlorinated Rubber Varnish.*

An alkali- and acid-resistant drying varnish is made by dissolving a chlorinated rubber of 40 to 70% rubber in a drying oil, such as china wood, linseed, blown rape seed oil, etc. Under certain conditions there may be used 2 parts of rubber of 40% chlorine with 1 part of chlorinated rubber of 70% chlorine. As softeners there may be used aryl phosphates, ortho dichlorobenzol, benzyl alcohol, monochloronaphthaline, etc. In one example chlorinated rubber of 70% chlorine (4) is combined with china wood oil (1), toluol (10), and about 30% or more of a pigment, such as zinc oxide, lithopone, etc. In another example the varnish comprises chlorinated rubber (5), blown rape seed oil (1), toluol (10). Enamels are obtained by adding zinc oxide, white lead, etc., to the varnish. These varnishes are particularly adapted for coating concrete surfaces. Resin, resin esters, gums, etc., may be incorporated. In order to produce flatting effects there may be incorporated a small quantity of paraffine, ceresine, beeswax, or other waxes. Anti-acid substances may also be added.

42.—Ellis; U. S. Pat. 1,695,639; Dec. 18, 1928; *Chlorinated Rubber Varnish.*

A varnish for coating wood or metal with a hard, tough, glossy finish is made by dissolving perchlorinated rubber in benzol, toluol, xylene, etc. A clear syrupy varnish can be made by dissolving chlorinated rubber of 67% chlorine or more (50) in benzol (150). Articles coated with such a varnish may be immersed in concentrated HCl, HNO_3, H_2SO_4, HF, etc., for considerable time without being attacked; immersion in 10% NaOH leaves the article unaffected. A particular application of the varnish is for coloring straw hats, willow, rattan, etc. Thus, a quick drying composition for coloring straw hats can be made by adding to the above varnish 3 parts of oil-soluble orange dye. If a thinner solution is desired then the varnish may contain perchlorinated rubber (50); benzol (250); and 3 to 10 parts of any desired oil-soluble dye.

43.—Ellis; U. S. Pat. 1,695,640; Dec. 18, 1928; *Chlorinated Rubber Varnish.*

By combining boiled linseed oil, or similar oils, with a chlorinated rubber of 50 to 67% chlorine there will be obtained solutions which give flat finish to the surfaces to which the solutions are applied. The quantity of oil may vary from 1/2 to 1/5 of the weight of the rubber. A suitable formula contains chlorinated rubber of 50% chlorine or more (20), linseed oil, boiled to increase its viscosity substantially (8), toluol (60), japan drier in liquid form (1). The chloro-rubber is dissolved in toluol by heating, and the other ingredients added while agitating. Such a varnish, applied to surfaces, will dry out rapidly in about ½ hour yielding a glossy, brilliant surface. Another composition comprises perchlorinated rubber (10), boiled linseed oil (10), toluol (30), liquid japan drier (3). The type of varnish compositions described can be used for impregnating wood, fabrics, etc.

44.—Ellis; U. S. Pat. 1,695,641; Dec. 18, 1928; *Stable Chloro-Rubber.*

Chlorinated rubber containing from 40 to 67% chlorine exhibits the tendency to decompose, freeing HCl, when subjected especially to high temperature, this tendency becoming rapid at 170° to 180° C. This tendency to decompose is objectionable; it is overcome by adding to the chloro-rubber certain substances of basic nature which are soluble in the solvent of the chloro-rubber, and which unite with the HCl freed, forming neutral compounds Such anti-acid substances include aniline, toluidine, urea, xylidine, diphenylamine, phenylene diamine, etc. Inorganic anti-acid materials, such as zinc oxide, barium oxide, magnesium oxide, etc., may also be used. The quantity of basic substance to be employed should be only slightly in excess over the amount necessary to combine with any acid present.

45.—Ellis; U. S. Pat. 1,695,642; Dec. 18, 1928; *Chlorinated Rubber Varnish.*

A quick drying varnish suitable as varnish reviver for automobile surfaces is made by dissolving a chlorinated gutta-percha in a solvent and adding to the solution a homogenizing agent which may include an aryl phosphate, a fossil resin, or a synthetic hydrocarbon resin. Preferably there is used tri-cresyl or tri-phenyl phosphate, with or without a quantity of a compatible resin. The yellow chlorinated gutta-percha is dissolved in benzol, carbon tetrachloride, etc., yielding a solution of low viscosity, which on evaporation leaves a bright, hard film, which is brittle. Addition of a homogenizer will make the film more flexible and less brittle, but this should be used in a proportion smaller than the chlorinated gutta-percha. The solvent employed should be so chosen that it will dissolve both the chlorinated gutta-percha and the homogenizing agent.

46.—Ellis; U. S. Pat. 1,695,643; Dec. 18, 1928; *Chlorinated Rubber Threads.*

Threads and filaments of chlorinated rubber are obtained by dissolving a chloro-rubber of 40 to 67% chlorine in a solvent to produce very viscous solutions which are extruded through fine orifices of the required diameter to obtain a thread of the required diameter. The threads obtained are slightly extensible but highly flexible and non-tacky, which can be wound or braided while some solvent is still present. The property of the filament thus obtained can be improved by adding about 10% of crude rubber to the chlorinated rubber in a solvent. In one example chloro-rubber is dissolved in CS_2 to make a 15% solution, and the solvent allowed to evaporate until a solution of jelly-like consistency is obtained which is forced, under CO_2 pressure, through fine glass orifices, and the extruded thread carried forward to evaporate the solvent and obtain lustrous threads of a

uniform cross-sectional area. Non-lustrous threads are obtained by extruding the solution into a coagulant.

47.—Bradley & Gibbons; U. S. Pat. 1,703,920; Mar. 5, 1929; *Halogenated Rubber Varnish.*

A low viscosity halogenated rubber varnish is obtained by combining a chlorinated rubber, such as that disclosed in U. S. Patent 1,627,725, with boiled drying oil, the necessary pigments, solvents, and other desirable compounding ingredients. A spirit varnish is made by dissolving a chlorinated vulcanized rubber (34) in a solvent mixture consisting of benzol (66) and naphtha (25). The viscosity of such a varnish is one half of that of a corresponding solution of rubber chloride and films from such spirit varnish are resistant to the action of hot water, resist abrasion, and can be used for coating wood, metal, etc. An oil varnish is obtained by dissolving chlorinated vulcanized rubber (100) in naphtha (160) and incorporating boiled linseed oil (100) into the solution with or without 0.5% of a drier. A dip lacquer may comprise chlorinated vulcanized rubber (100); a white pigment mixture (25 to 250) containing 40% of white lead and 60% of titanium oxide; benzol (375 to 1750). By substitution of 5 to 50% of toluidine toner or ultramarine blue for the white pigment there will be obtained red or blue dip lacquers.

48.—Dennison; U.S. Pat. 1,713,746; May 21, 1929; *Leather Substitute.*

A material closely resembling suede leather is made by applying a fibrous rubber composition to a textile fabric backing, vulcanizing, abrading the vulcanized rubber surface to expose minute ends of the fibres so as to produce a nap practically invisible to the eye, and finally treating the abraded surface with a halogen to form an indurated surface. The textile backing sheet may be knitted or felted and it may be first given a rubber cement coating. The fibrous rubber composition is then applied over the rubber cement and vulcanized in any convenient manner. The vulcanized rubber surface is then treated with a sandpaper roll revolving at relatively high speed to abrade the rubber surface and expose short ends of the fibres producing a pile effect of suede leather. The abraded surface is then treated with an indurating solution consisting of a 3% solution of bromine to harden the surface. Other halogens or sulfur chloride may be used for the indurating treatment. The resulting product is particularly suitable for making rain coats, shoes, spats, etc.

49.—Nickowitz; U. S. Pat. 1,746,162; Feb. 4, 1930; *Finishing Rubber Surfaces.*

A rubberized sheet is coated with casein and the casein surface halogenated in such a way that the halogen does not penetrate the rubber surface to any appreciable extent. Thus, a textile cloth is given two coatings of a vulcanized rubber composition by a spreading process. The coated fabric is calendered, dusted with magnesium carbonate and cured. The rubber surface is then varnished with a casein composition comprising casein (80 grs.), water (15 cc.), glycerine (5 cc.), alcohol (80 cc.), ammonium hydroxide (7 cc.), formalin (7 cc.). This composition is diluted by adding one part of water for each 7 parts of casein solution, and applied in this form to the cured rubber surface. The dried casein coating is then treated uniformly with a 4% solution of bromine in carbon tetrachloride, followed by a neutralizing treatment in an atmosphere of ammonia vapors. The resulting product is characterized by a velvety smoothness, resistance to water spotting, and retention of pliability. The process may also be carried on as described in U .S. Patent 1,631,722. An embossed product may be obtained by coating the fabric, dusting it, embossing, covering the embossed surface with another rubber coating, applying the casein solution and halogenating it.

50.—Ellis; U. S. Pat. 1,750,583; March 11, 1930; *Chlorinated Rubber Products.*

Chlorinated rubber sheets, threads, blocks, strips, etc. are produced by combining a substantial quantity of a plasticizer, such as an aryl phosphate or an alkyl phthalate, with a perchlorated rubber of 60 to 75% chlorine content. Concentrated solutions of these mixtures are adapted for making leather substitute products. A specific feature of this patent is the degasifying of the solution mixture so as to prevent the formation of gas bubbles in the films obtained therefrom. Degasification may be effected by distilling the solution until about 50% of the solvent is eliminated, or by boiling the solution with fuller's earth, infusorial earth, etc., under a reflex condenser, and filtering the treated solution. The following formulas are given: I—Chloro-rubber (10), toluol (25), triphenyl phosphate (4). II—Chloro-rubber (10), toluol (25), triphenyl phosphate (1), diethyl phthalate (2). III—Chloro-rubber (10), carbon disulfide (25), diethyl phthalate (1), triphenyl phosphate (2). IV—Chloro-rubber (9), benzol (24), camphor (1), diethyl phthalate (2), pentachlorethane (0.5). V—Chloro-rubber (14), benzol (20), toluol (20), camphor and diethyl phthalate (1 of each). VI—Chloro-rubber (10), benzol (50), camphor and diethyl phthalate (1.5 of each).

51.—Emery; U. S. Pat. 1,762,165; June 10, 1930; *Finishing Rubber Surfaces.*

A rubberized rubber sheet having a permanent dull finish is obtained by rubberizing a fabric base, calendering and curing it; starching the cured surface and halogenating to impart to it a hard and dull finish. In the making of the sheet a vulcanized rubber composition is spread on the fabric backing and passed through a calender. The calendered surface, which has a shiny and lustrous surface, is dusted with starch, excess powder removed by rotating brushes, washed with volatile liquid, such as carbon tetrachloride or benzene, festooned in a vulcanizer and cured. The surface is then subjected to an atmosphere of bromine gas or treated with a solution of bromine or other halide, or sulfur halide, or both. More specifically, it is subjected to the action of sulfur chloride in carbon tetrachloride. The product, which has a smooth, hard and permanent dull finish, can be used for making waterproof garments, hand bags, tobacco pouches, etc. Before starching the rubberized surface, it may be treated with a soap solution.

52.—Geer; U. S. Pat. 1,773,101; August 19, 1930; *Chlorinated Rubber Varnishes.*

A coating composition for making articles gas-, oil- and water-proof is made by dissolving an oil, such as rapeseed, tung, linseed and corn oil, etc., with a chlorinated rubber in a solvent, such as benzene, and sulfurizing or oxidizing the solution. In the example given rubber heptachloride (5) is dissolved in benzene (25) and a drying oil (5) with sulfur chloride added thereto. The mixture is rapidly agitated until a thick, smooth gel is obtained. To facilitate the application of this gel to surfaces it may be admixed with some more solvent to produce a plastic gel of the consistency of fruit jellies. Rubber hydrohalide may also be used. The resulting varnishes are particularly suitable for treating paper containers adapted to contain fats, oils, and other foodstuffs; they are valuable as acid resisting coatings for metal surfaces, for balloon fabrics, etc.

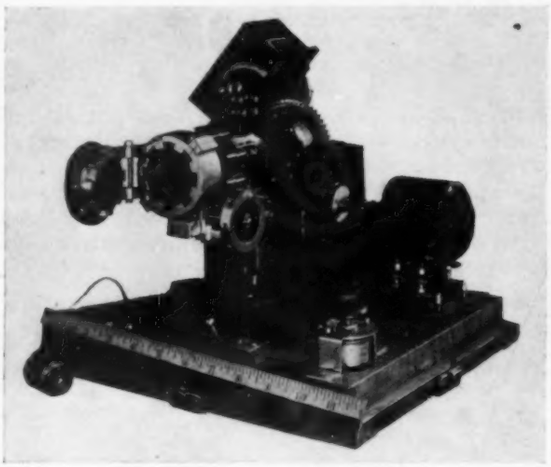
53.—Garvey; U. S. Pat. 1,810,560; June 16, 1931; *Halogenated Products.*

Adherent coatings of rubber chloride, which may contain a plasticizer to reduce its brittleness, are applied to soft rubber surfaces by first chlorinating the surface of the rubber, and then applying thereto the rubber chloride coating. The process is illustrated for coating a nitric acid-resistant metal container. The metal surface is coated with a layer of soft rubber in any known manner. The surface of the rubber is then exposed to chlorine gas containing benzene vapors for about 12 hours. The chlorinated rubber surface is then coated with rubber chloride (100) which contains ortho-nitro diphenyl ether as a plasticizer (25) and is dissolved in benzene (700). Five coatings are sufficient. A coating resistant to the action of petroleum oils, such as gasoline, comprises rubber chloride (100), blown linseed oil (100), benzene (1,000), and it can be applied to a halogenated rubber surface which may be rubber hydrohalide or halide. It is important that the quantity of non-volatile liquid plasticizer used be large, up to 100% of the weight of the rubber chloride. The plasticizer should be selected as to be resistant to the action of substances with which the rubber halide surface is to contact. Suitable plasticizers are xylene, naphthalenes, chlorobenzenes, chlorophenyls, chloronaphthalenes, dinitrotoluene, dinitrochlorobenzenes, nitro-anisol, aniline, dibutyl phthalate, benzyl benzoate, chlorinated china-wood oil, etc. In some cases the soft rubber surface may be treated with hydrogen chloride dissolved in water, acetone, ethyl acetate, etc., to convert the rubber surface into a rubber hydrochloride. The rubber chloride may be adhered to the halogenated rubber surface in form of a sheet by means of a cement.

(To Be Continued)

Royle Model Shows Improvements

EXEMPLIFYING new changes and improvements in rubber machinery manufactured by John Royle & Sons, Paterson, N. J., a miniature operating model of an 8-inch straining and tubing machine has been built to 1/10 scale by the company's engineering department, and is now being exhibited to rubber manufacturers throughout the country. The model is complete with a 1/500 h.p. motor, and is an exact replica of their production machines, including Timken thrust bearing, worm gears, steam and water jackets, reversible motor base, coupling, and general finish.



Miniature Model of Strainer and Tuber.

The model has two types of head for straining and one for tubing or tread work. The head illustrated is of a new bayonet-lock type for straining. It has a worm-and-gear operated ring, controlled manually by a hand wheel. The ring, which is just ahead of the screen, is rotated 1/8 turn to lock the eight lugs on the ring behind eight lugs on the swinging gate head; or the reverse motion to open, as the case may be. These lugs, when interlocked, close the head firmly. An earlier type of strainer head operates with bolts and nuts, which, however, are not in so much favor in some localities.

Another advantage of the breech-lock head, besides the time saved, is the even distribution of pressure on all sections of contact. All points are shown to near perfection on the miniature model. The building of such an exact replica, even to the minute points mentioned, by the Royle craftsmen, speaks well for that company's ability to manufacture precision production machinery.

Age-Rite HP—Flex Crack Resister

A NEW material called Age-Rite HP, especially developed for protection against flex-cracking, heat deterioration, reversion and static oxidation, has been announced by the R. T. Vanderbilt Company, New York. Its producers felt that although some anti-oxidants exerted a definite retarding effect on flex-cracking, a definitely effective material was required to permit compounders to avail themselves of the wear-resisting advantages of increased gas black without the disadvantage of increased cracking, particularly in tires, belts, soles and footwear.

Age-Rite HP is a mixture of two secondary aromatic amines, in non-caking powder form. It is dark gray in color, S. G. 1.20, faint odor (but odorless in rubber stocks), melting point below 100° C. It is insoluble in water, somewhat soluble in gasoline, and easily soluble in benzene and carbon disulphide. It blooms from cured or uncured rubber if over 1.5% on the rubber is used. Stocks containing Age-Rite HP turn brown when exposed to sunlight and it is therefore not recommended for white or light colored stocks. It has practically no activating effect on vulcanization.

The amount recommended is 1 to 2% on the rubber and for such stocks as tire treads, tire carcass, tubes, wire insulation, mechanicals, footwear, and high carbon stocks. Like all Age-Rite anti-oxidants it is non-toxic.

Goodyear "Double Tube" Demonstrated

DEVELOPED by engineers of the Goodyear Tire & Rubber Company, Akron, a new type tube to prevent serious accidents from tire blowouts at high speed, was demonstrated before a group of public officials, technical engineers and others, on February 5, at Floyd Bennett Field in New York City. The new tube is said to be radically different in construction than anything previously attempted. It consists of a "double tube," one inside the other, joined together at the base, with a single vent hole connecting the two air chambers.

The outside tube is similar in function and appearance to a regular tube and fits against the inside of the casing, while the inside tube or "lung," built of two plies of fabric, floats free without chafing. Inflation is conducted in the usual manner, the vent hole permitting air to pass from the inner chamber to the outer chamber so that in ordinary service the inner carcass is under no strain, but simply floats free inside the tube.

When a blowout occurs the air escapes from the outside chamber immediately but can escape from the inner chamber only through the single small vent hole. Thus only a portion of the air is lost in the blowout and the tire drops down slightly to ride on the inner fabric carcass, which loses its air very slowly. This permits the car to continue under control, giving the driver ample time to pull off the road and stop without endangering himself, his car or the lives of other motorists. In effect, the new tube converts a sudden blowout into a slow leak.

Illustration Shows "Double Tube" Arrangement

During the public demonstration blow-outs were caused by a knife ripping into the tires, controlled by the driver, at a speed of 60 miles per hour. Other blow-outs were caused by running over sharpened spikes. The car was kept under control by the driver after each blow-out.

Current Technical Developments

Hydrogenation of Rubber; Photoelastic Properties of Rubber; Beta-Trichlorethane; Higher Alcohols in Rubber Compounding

Hydrogenation of Rubber

THE program of the British Fuel Research Board of the Department of Scientific and Industrial Research dealing with the hydrogenation of coal, and products obtained from coal, has also embraced the study of other natural materials allied to the original vegetable matter from which the coal has been formed. A suggestion that the carbonization of rubber might produce an automotive fuel led to an examination of this material from the viewpoint of its possible hydrogenation.

In the board's annual report, just issued, the rubber is stated to have proved readily amenable to hydrogenation, and further, that by suitable adjusting the temperature it is possible to produce either gasoline or lubricating oil. It is realized, of course, that the manufacture of these products from rubber would not be economic unless the rubber was available at a very low price.

The behavior of rubber under hydrogenation-cracking conditions was first examined in 2-litre discontinuous converters. A molybdenum sulphide catalyst supported on alumina gel was used, and, at a reaction temperature of 450° C., it was found possible to obtain a yield of product in which the spirit boiling below 200° C. amounted to 50 per cent by weight of the original rubber. The spirit was stable, water white and practically free from unsaturated hydrocarbons; it would be suitable for use as an automobile spirit without any refining treatment other than distillation.

At a temperature of 350° C., a product was obtained which on fractionation under reduced pressure gave a pale-yellow viscous oil (b.p. 200°-300° c. at 4 mm. pressure), amounting to 13 per cent by weight of the original rubber.

Lubricating oil	Fraction from rubber	Poor petroleum oil	Good petroleum oil
D_4^{20}	0.916	0.949	0.880
Aniline point .....deg. C.	77	67	113
% Loss in weight after heating at 150°C.	7	6	0.6
Viscosity at 25°C.....poises	4.05	4.86	3.11
Viscosity at 50°C.....poises	0.602	0.726	0.701
Viscosity at 75°C.....poises	0.173	0.205	0.238

The oil was subjected to an oxidation test by heating for 24 hours in air at 150° C. By this treatment it lost 7 per cent by weight, but the residue after heating was a clear oil, though darker in color than the original oil; it was not sticky or gummy and contained only traces of pitch. The properties of the oil are shown in the accompanying table, given in comparison with two petroleum lubricating oils.

It was concluded, from the density, aniline point and stability to oxidation, that the viscous oil obtained by the hydrogenation of rubber would be suitable for use as a lubricant. The viscosity of the oil is its poorest quality. The viscosity-temperature gradient is much steeper than that of a good lubricating oil, although very similar to that of a poor lubricating oil from an aromatic-paraffinous base petroleum. It is possible that the oil's viscosity might be improved by some means of refining, such as solvent extraction.

	Yields % of weight of raw material		
Reaction temperature, deg. C.	Total oil product	Spirit to 200° C.	Viscous Oil b.p. 195°-320°C. at 4-5 mm. pressure
480	81.1	63.0	None
450	96.1	42.9	None
400	98.8	19.7	17.2
390	99.0	17.9	21.3
380	98.0	13.8	21.0
370	98.6	10.6	21.5
360	99.0	8.7	21.6

It was found that the fractions distilling above 200° C. of the oil produced by the hydrogenation of rubber dissolves rubber fairly readily, and that 50 per cent solution of rubber in this oil could be made without difficulty. A method of operating a continuous process for the hydrogenation of rubber was therefore indicated. A 50 per cent solution of rubber containing 1 per cent of dissolved sulphur was prepared and treated in the larger of the two laboratory-scale continuous hydrogenation plants at the Fuel Research Station in the presence of the verters. A molybdenum sulphide catalyst supported on tion of rubber was forced into the plant continuously in exactly the same manner as in the treatment of low-temperature tar. The sulphur was added to the solution in order that the molybdenum oxide would become converted to molybdenum sulphide during the process.

The conditions of operation were as follows:—(a) a reaction pressure of 200 atmospheres; (b) reaction temperature varying from 360° to 480° C. in different tests; (c) the rate of flow of residual gas, by which the throughput of hydrogen is controlled, was 140 litres per hour; and (d) the throughput of rubber solution was 220-250 ml. per hour.

The yields of spirit and of viscous oil at the various reaction temperatures are recorded in the second accompanying table.

Photoelastic Properties of Rubber

SEVERAL tests have recently been conducted by the National Bureau of Standards to determine the photoelastic properties of rubber. The value of these properties is described, as follows, in the December, 1934, issue of the *Technical News Bulletin*, issued monthly by the Bureau:

Transparent rubber is one of a number of materials which when stressed exhibit the phenomenon of double-re-

fraction. When a sheet of transparent rubber is stretched and is examined by means of polarized light it is crossed by a beautiful display of colored bands. The direction, number, and color of these bands are related to the direction and the magnitude of the stresses in the rubber. Important applications are made of this photoelastic effect in connection with various materials other than rubber; for example, it is used to find the strains in optical glass, and is employed to indicate stresses in models of bridges and dams made of bakelite or celluloid.

Rubber, however, has not been employed in such studies, although it is the only material available for photoelastic work which can be stretched to any great extent. When a photoelastic study was undertaken using a rubber model, data which were needed regarding the photoelastic constants were not available. An investigation (described in RP751 in the December, 1934 *Journal of Research*) was therefore undertaken for the purpose of obtaining accurate measurements on the relative retardation per unit thickness and a related magnitude, the stress-optical coefficient.

Transparent rubber compounds of a number of typical compositions were examined, and values of the coefficient of retardation and the stress optical coefficients were found for samples of each composition when subjected to relatively wide ranges of stress. The results obtained were very concisely and accurately expressed by simple equations, one for each compound. The constants of these equations, in turn, were related to the composition of the rubber.

In the case of rubber-sulphur compounds, the relation depended simply on the combined sulphur content, and all measurements on these compounds could be expressed by a single equation.

Beta-Trichlorethane—A New Solvent

ANNOUNCEMENT of a new solvent for natural and synthetic rubbers, called Beta-Trichlorethane, has been made by the R. & H. Chemicals Department, E. I. du Pont de Nemours & Company, Inc., of Wilmington, Delaware. This new solvent is a non-inflammable, water-white chlorinated hydrocarbon with the following properties:

Chemical Formula	CH_2Cl-$CHCl_2$
Molecular Weight	133.40
Color	Colorless Liquid
Boiling Point, °C.	114
Latent Heat of Vaporization, cal./g.	68.7
B .T. U./lb.	123.5
Specific Heat, (20° C.) cal./g./°C.	0.270
Specific Gravity (20°/4 °C.)	1.4406
Pounds per Gallon	12
Refractive Index	1.4458

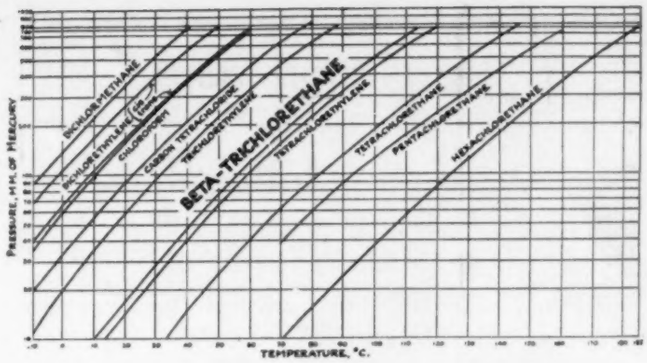
VAPOR PRESSURES

TEMPERATURE °C.	TEMPERATURE °F.	VAPOR PRESSURE MM. OF MERCURY
90	194	369
100	212	505
110	230	680
114	237	764

Solvent Power:—Like other chlorinated solvents, Beta-Trichlorethane readily dissolves oils, fats, waxes, tars natural resins and free alkaloids. It is miscible with alcohol, ether and other organic solvents, but is practically immiscible with water.

Stability:—Beta-Trichlorethane does not readily oxidize or turn "sour." It is unusually stable toward oxidation even in the presence of light. Large amounts of water affect the stability only slightly. It is almost as stable towards hydroylsis as Trichlorethylene and Tetrachlorethylene.

The relation of the vapor-pressures of this solvent to those of other du Pont non-inflammable chlorinated solvents is shown in the accompanying chart.



Toxicity:—Beta-Trichlorethane is, to a certain extent, toxic. Nevertheless, experience indicates that under proper conditions it may be handled without any attending hazard if all due precautions are taken to preserve and safeguard the health of workers.

Higher Alcohols in Rubber Compounding. II.

ADDITIONAL tests to further determine the value of higher aliphatic alcohols in assisting the dispersion of carbon black in rubber, substantiate earlier findings. These more recent tests indicate that such alcohols function not only as dispersing agents, but also as powerful plasticizers and cure activators. Results determined by the later tests are described by W. B. Weigand, technical director of the Binney & Smith Company, New York, in the January, 1935, issue of *Canadian Chemistry and Metallurgy*, which journal carried the earlier article on the previous tests in its February, 1934, issue.

Tables derived from the later tests indicate that when glycerine and Captax are pre-cooked the curing properties seem slightly improved. In another test, instead of the accelerator being reduced it was kept constant and glycerine and Hegolit 3 added directly with the result that the glycerine improved modulus and tensile at optimum cure, whereas Hegolit did not. Another indicated that the major effect of glycerine must be ascribed to the neutralization of pine tar acids since when larger amounts of glycerine were used (a dosage of .75% glycerine on the rubber) the rate of cure was speeded up and the modulus increased with a beneficial effect on tensile strength. The amount of glycerine necessary to neutralize the Captax acidity was only 0.2%.

From examination of the raw stock, both when fresh and after eight months storage, Mr. Weigand states that there seems to be a likelihood that a reaction product of glycerine and pine tar in suitable proportions might be a softening agent for rubber worthy of consideration. He draws the following conclusions from the tests made:

1.—Glycerine has been shown to improve the curing behavior of tread mixings accelerated with mercapto and softened with pine tar.

2.—The effect of direct addition of glycerine, without reduction of tar, was quite marked; whereas similar direct addition of certain higher aliphatic alcohols was without specific effect.

3.—A pre-cooked mixture of one part glycerine with three parts of medium pine tar improved the rate of cure, modulus and tensile strength of a mercapto tread stock containing 50% of carbon black, as compared with a control using straight pine tar.

4.—The above conclusions, since they do not include ageing results nor road tests for abrasion resistance, must be accepted as preliminary.

New Equipment

A Stabilized Gyrating Screen

UNDER the trade name of Day Ro-Ball, a new line of gyrating screens for handling such materials as soap powder, wood flour, zinc oxide, etc., has been announced by the J. H. Day Company, Cincinnati, Ohio. The ma-

terial comes into contact with every square inch of surface on these new screens. The gyrating action forces the fine material against the screen surface while a screen cleaning device hastens the flow of the finer particles through the mesh openings assuring a clean screen under all conditions. Among the distinctive features of the several models claimed by the company are included the following: one-point lubrication; inspection ports with a dust-tight machined tapered fit which can be removed for inspection of the screen cloth while the machine is in operation; heavy all-welded steel supporting frames; either unit motor or pulley drive; and a spreader plate which extends the full width of the top cover just below the intake assuring uniform feed over the entire width of the screen.

Controllers for Platen Mold Presses

TWO new control instruments, both of which can be used in controlling platen mold presses, have been introduced by the Foxboro Company, of Foxboro, Mass. Almost identical in appearance one controls temperature,

the other pressure. The dial and knob on the lower face of the controller permits adjustment of the temperature or pressure within the range of the instrument. The indicating gauge above the adjusting knob shows the air pressure on the diaphragm motor of the control valve and also shows whether the valve is opening or closing. On the temperature controller, illustrated herewith, a two-inch dial type thermometer may be installed in place of the air gauge. This thermometer is connected to the same bulb as the controller thus showing the temperature being maintained. The pressure controller may be equipped likewise with a high pressure indicating gauge that shows the pressure being controlled. In either case, it is necessary to mount a valve motor air gauge on the air line to the valve outside the case. All working parts are integral with or mounted on a cast aluminum base. By removing the set screw in the setting knob and removing the two screws shown on the face of the instrument, the entire case can be removed, leaving the interior open to inspection.

Tiering Fork Trucks

ANSWERING an industrial demand for a device that could be used to tier stock sufficiently high to increase storage capacity in factories, the Elwell-Parker Electric Company, Cleveland, devised a special method designated the Pallet System, a method comprising tiering fork trucks together with flat wooden pallets. These are loaded with standard containers or other large units and are transported, tiered and taken down again for delivery by the fork truck without disturbing the pallet load and without any manual effort. The company is building two types of

tiering fork trucks, electrically and gas operated. They are high-speed, heavily-powered and capable of handling loads up steep ramps. A transmission safety-lock is supplied on the trucks to hold them on ramps if stopping is necessary. The trucks have a rated capacity of 4,000 to 7,000 pounds and a travel speed of 6 to 12 m.p.h. Forks are adjustable, elevation of load is accomplished by means of a cylinder, the lowering valve is manually controlled, and the movement of forks either up or down can be stopped instantly at any travel point. These tiered fork trucks can be used in a rubber factory for transporting raw materials and milled stocks, in the shipping room, for stacking finished products such as tires or packaged items, and many other purposes.

Utility Junior Laboratory Mill

A SMALL mill for laboratory work, termed the "Utility Junior Laboratory Mill," has been introduced by the Utility Manufacturing Company, Cudahy, Wisconsin. The mill has rolls of approximately 3¼ inches diameter with 6 inch face. It is geared to give a reduction of from 1¼ or 1½ to 1, as desired. These dimensions permit very small batches to be mixed for experimental work. It is equipped with a 1 h.p. motor so arranged that the drive roll turns 36 r.p.m. Overall dimensions of the new mill are 12 x 36 inches. The entire unit is mounted on a steel base.

HANDBUCH DER GESAMTEN KAUTSCHUKTECHNOLOGIE. (Handbook of Rubber Technology). Edited by Dr. Ernst A. Hauser. Published by the Union Deutsche Verlagsgesellschaft, Berlin, Germany. Written in German. 2 Volumes. 1640 pp. 1,066 illustrations. 280 Marks, equivalent to approximately $112.00 at the current exchange rate.

(Available from the Book Department, THE RUBBER AGE*)*

Consisting of two volumes, comprising 1640 pages in all, with more than one thousand illustrations, including numerous charts and diagrams, this handbook, if handbook it may be called, is one of the most valuable contributions to rubber literature yet conceived. Covering practically every known field in which rubber is utilized for manufacturing purposes, the key to the exceptional value of the book lies in the fact that the compiler, Dr. Hauser, sought and secured the cooperation of rubber specialists in the United States, England, France, Germany, Hungary and Austria for each subject discussed.

According to Dr. Hauser, in the preface of the book, the need for a summary of the progress of rubber technology has been growing rapidly in recent years, not only among rubber technologists and engineers desiring a comprehensive survey of the entire field of rubber, but also in many other industries where rubber is now used. With this end in view the various collaborators contributing to the book were selected for their special fitness to present the subject selected. The result is a book which presents not the ideas of any one individual or small group, but the knowledge gained by many minds in every specialized field of rubber manufacture. This is well illustrated by the chapter heads of the book, a complete list of which follows:

VOLUME I—Chemical Analysis of Rubber, Dr. Fritz Frank; Technical Analysis of Rubber, Dr. Fritz Frank; Rubber Machinery, Colin Macbeth; Rubber Compounding, Dr. Josef Talalay; Rubber Reclaiming, Dr. Paul Alexander; Rubber Substitutes, Dr. Walter Alexander; Technical Rubber Goods, Dr. —Ing P. Kluckow; Rubber Tires and Tubes, R. P. Dinsmore; Use of Rubber in Railroads, Colin Macbeth; Use of Rubber in Automobiles, Dr. Ernst A. Hauser; Erasers, Dr. Josef Talalay; Rubberized Fabrics, Dr. Erich Wurm; Rubber Belting and Conveyors, Kurt Hesse; Artificial Leather, Walter Munzinger; Artificial Velour, Jean Marconnet; Adhesive Tape and Medical Plasters, Dr. Hans W. Albu; Recovery of Solvents, Dr. A. Englehardt.

VOLUME II—Rubber Balls and Similar Hollow Articles, Dr. H. Kassner; Tennis Balls, Dr. Ernst A. Hauser; Golf Balls, W. J. Perry; Rubber Toys, Dr. Stefan Dorogi; Dipped Goods, Senator F. Thiele and Dr. Erich Wurm; Cut Sheet, Senator F. Thiele and Dr. Erich Wurm; Rubber Sundries, Dr. Erich Wurm; Rubber Footwear, Dr. Josef Talalay; Sponge Rubber, S. A. Brazier; Rubber Flooring, W. H. Reece; Rubber Roads, L. Gaisman; Rubber Thread, Max Draemann; Gaskets, Dr. H. Pahl; Rubber Insulated Wires, R. A. Schatzel; Ebonite, Dr. H. Kassner; Rubber Lined Containers, Eduard Vossen; Rubber in Friction Elements, James Driscoll; Dental Rubber, Dr. Erich Wurm; Rubber in Abrasive Wheels, Dr. R. C. Benner and O. L. Mahlman; Technology of Latex, Dr. Ernst A. Hauser; Oxidation and Aging of Rubber, Dr. F. F. Kirchhof; Rubber Derivatives and Artificial Isomeres of the Natural Rubber Hydro-Carbon, Dr. F. F. Kirchhof.

These titles, and their authors, many of whom are internationally recognized as specialists in their individual fields, give some idea as to the fields covered and the value of the book to both newcomers in the rubber industry and those working daily with rubber problems. Dr. George D. Kratz, well-known consulting chemist, in reviewing the handbook for THE RUBBER AGE stated, in part—"The presentation of the subject matter is so faithfully described and in such great detail, that the *opus* as a whole more closely approximates its title than any similar compilation to date . . . while it is impossible to cover so wide a scope without a certain amount of repetition, it may be said that Dr. Hauser and his associates have in two volumes as completely covered the entire field of rubber technology as would be possible now."

The book also contains complete name and subject indexes at the end of the second volume, with numerous references to patents and prior literature cited throughout the two volumes. Undoubtedly this monumental work should be on the book shelf of every rubber factory and of all technologists interested in being well posted on the latest developments in any phase of rubber manufacturing, analysis or testing.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry

A STORY OF MAN-MADE RUBBER. Distributed by the Rubber Chemicals Division, E. I. du Pont de Nemours & Company, Wilmington, Delaware. 12 pp.

Although technical papers of interest and understanding to technologists on DuPrene have appeared in the trade press for the past several years no literature was available covering a popular description of this synthetic rubber until the appearance of this booklet. Written in clear and understandable English the booklet is intended for the business man and engineer. Steering away from technical angles it clearly describes how DuPrene is synthesized from such abundant natural raw materials as coal and limestone. It also discusses the various DuPrene compositions, costs in comparison to natural rubber, special properties, industrial applications, and similar subjects. Making but brief reading, this booklet is recommended to every person in the rubber industry irrespective of his position.

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CALCENE DATA SHEETS V. Distributed by The Columbia Alkali Corporation, Barberton, Ohio.

A series of curves and tables in these data sheets show the results obtained in latest experimental work on Calcene as a compounding ingredient in various types of rubber stocks. Diagrams show stocks which, with slight modifications, are suitable for inner tube and similar uses. Other diagrams give comparisons at fairly high loading of Calcene, Blanc Fixe and another quality calcium carbonate pigment, as well as showing the effect of varying the loading of Calcene over a fairly wide range.

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AUTOMATIC TIMING. Issued by the Walser Automatic Timer Company, Chrysler Building, New York. 4 catalog sheets.

In view of the trend toward automatic timing by industry in general, this catalog is of value to factory managers and engineers. It discusses, illustrates and describes in detail various timing devices featured by the Walser concern, and includes specification tables of these various models. Automatic timing devices are, of course, adaptable to rubber machinery, the catalog pointing out such procedure.

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FURNACE LININGS AND ARCHES. Distributed by the McLeod & Henry Company, Troy, New York. 32 pp.

This catalog deals particularly with the "Steel Mix" fire clay furnace linings and arches produced by this company, manufacturers of a complete line of refractory materials and designs for furnaces, etc. Various boiler door arches and jambs made by the concern are described and illustrated. Other chapters discuss suspended walls, blow-off pipe protectors, suspended arches and fire bricks.

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pH TESTING BY THE INDICATOR STRIP METHOD. Issued by Pfaltz & Bauer, Inc., 300 Pearl Street, New York City.

This booklet contains a concise description of a new method of pH testing suggested for use with small or large quantities of highly colored, turbid, viscous, and semi-solid mediums. These conditions often prevail in industrial manufacture and the method described as the "indicator strip method" facilitates testing requirements as outlined in the booklet.

Editorial Comment

Definite Up-Trend

FOR several years economists have buoyed up the waning hopes of failing industry with promises for better conditions in the "near future." At times industrial spurts seemed to bear out these encouraging predictions, only to peter out. But for the past twelve months there has been a definite indication of an upward trend which does not require the services of an economist to grasp. Rubber manufacturers have slowly but steadily surged ahead. It was at first apparent in financial statements which reversed heavy losses to slight profits, in some cases, substantial profits in others. It was again apparent in the news that the employment situation was in an improved state. Latest developments are further encouraging.

For instance, for the first time in a decade Goodyear is operating its factories on Sundays. For the first time since 1930 several Akron rubber factories are operating 24-hour day schedules. Rubber manufacturers in and around Akron, with few exceptions, have increased wages for the fourth time in two years, latest increases averaging 3 to 6 cents an hour. "As goes the rubber center (Akron) so goes the rubber industry." Tire manufacturers are again piling up huge inventories for the awakened automobile industry. The retail trade has taken kindly to the recently increased tire prices. Additional increases are planned for March 1, with still others before May 1.

These are not encouraging "reports." Nor are they "predictions" made by highly-salaried economists. These are facts. Wages in the rubber industry have been raised, with more than 40,000 workers benefited. Factories are approaching peak production again. The up-trend seems to be very definite with recovery not only in sight but this time right around the now-famous Hoover corner.

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Action on Japanese Goods

LAST month, in editorializing on the influx of Japanese-made rubber goods into the United States which are sold at demoralizing prices, and discussing the nature of complaints registered with recovery officials at Washington, we expressed the hope that this time actual steps would be taken to remedy an evil situation. Charges of "red tape" already filled the air with Representative Dow Harter, of Ohio, sparing no adjectives in placing the blame. The militant Ohioan has gone further. He has secured action.

In the original complaints, which seeped into public print, several rubber concerns, including Sun Rubber and Seiberling Latex Products, through Representative Harter, made general charges of unfair Japanese competition, accused Japanese manufacturers of duplicating American-made rubber novelties, and asked for relief provided by the terms of the National Recovery Act. Last month the rubber companies' spokesman went much further. He brought specific charges against seven importing houses, all located in New York City, named names, and accused these concerns with sending new American rubber toys and novelties abroad to Japanese factories, receiving, in turn, duplicated toys and novelties made in Japanese factories, and in merchandising these duplicated items in such wise that the purchasers believed they were buying American-made goods. These are specific charges. They could not, and cannot, be overlooked. Representative Harter forced the hand of diplomatic officials, demanded and received action in the definite promise of the export division of the NIRA to thoroughly investigate and thrash out the matter and to take steps to remedy the situation if the charges are proved.

We hope that Representative Harter continues to be as militant. His big job is yet to come. Investigations too easily drag on for months and months with no steps taken for relief of the complainants during the course of such investigations.

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Absorption in 1935

WITH preliminary figures compiled by the Leather-Rubber Division of the Bureau of Foreign and Domestic Commerce setting world absorption of crude rubber during 1934 at the all-time high of 930,000 tons, it is interesting to estimate the possibilities for the current year. Practically every estimate for 1935 we have seen in the past two months has set the figure over 1,000,000 tons. We believe this figure will be reached but doubt if it will run more than a few thousand tons beyond it, as many estimates indicate.

According to F. R. Henderson & Company, which bases its estimates on figures supplied by both the Department of Commerce and the Rubber Growers' Association (of England), the production quota permitted by the Restriction Committee, including allowances for increased exports of certain petitioning countries such as Siam and French Indo-China, will be 1,143,000 tons in 1935. Assuming that the 25% reduction will be maintained during the year net production will approximate 871,000 tons. If consumption reaches the 1,000,000 ton mark, as expected, rubber stocks will be reduced almost 130,000 tons.

Whether the 1,000,000 ton mark will be reached in consumption depends, of course, on economical conditions. But with American rubber factories reaching peak production, with Akron factories alone absorbing almost 50,000 tons of crude rubber monthly, chances favor reaching a new all-time record in 1935.

CURRENT • NEWS
of the Rubber Industry

FEBRUARY, 1935

Rubber Manufacturers Raise Wages of Employes As Production Nears Greatest Peak Since 1930

Conditions Seem Excellent as Automobile Manufacturers Swing Into Active Production—Several Factories Are Operating 24-hour Shifts—New Price Rise Is Foreseen

FOR the first time since the boom days of 1929-1930 rubber manufacturers in and around Akron are operating their factories on 24-hour per day schedules. For the first time in a decade the Goodyear plant's tire division worked regular shifts on several Sundays last month. Akron rubber manufacturers are absorbing 50,000 tons of crude rubber per month with world absorption figures just reported for the year 1934 reaching an all-time record of 930,000 tons. Most of this increased activity is attributed to the efforts of Goodyear, Goodrich, Firestone and General to build up an inventory of tires for original equipment to meet the current demand of the booming automobile industry.

In keeping with this renewed activity rubber manufacturers have raised wages of both factory and office personnel. Increases average about 6%. Firestone increased wages approximately 5 cents an hour for all clock workers. Goodrich is reported to be paying from 3 to 6 cents more per hour. Goodyear will also raise wages but no definite amount or percentage has yet been made public. Wage boosts were also made, effective January 28, by the Ohio Rubber Company, of Willoughby, amounting to a minimum of 5 cents per hour.

These wage increases are the fourth made by Akron rubber manufacturers in the last two years. In June, 1933, wages were raised about 10%. Two subsequent increases were made of 7½ and 10% respectively. Present hourly wages are about 21% higher than they were in 1929. Approximately 40,000 workers received the benefit of the new increases.

New Price Rise Coming

Another development in the situation of the rubber industry is expected to materialize in the guise of additional price rises on tires and tubes. Leaders in the tire industry predict new rises approximating 20% before May 1. These increases, according to A. A. Garthwaite, vice president and treasurer, Lee Tire & Rubber Company, will be justified by the higher level of raw material costs. William O'Neil, president of the General Tire & Rubber Company, is another leader to foresage increased tire prices. In commenting on the current status of the industry on the occasion of his annual report to General stockholders Mr. O'Neil stated that while conditions were invariably much better additional price rises were essential because of increased costs in raw material and higher wage rates.

While the 20% increase may not be announced as a bulk increase by May 1 the industry will probably raise tire prices about 5 to 10% on that date, with an additional increase in another 30 to 60 days.

Although there is little danger that the rubber industry will find itself in a position where it will be unable to meet industrial demands due to the enormous production capacity of the industry as a whole, a condition apparently existent in other industries, yet definite progress toward real recovery is in the making.

By far the majority of rubber manufacturers have reported net profits for the year just passed, compared with a reversed situation in the preceding year. This progress was in keeping with better business conditions apparent in the automotive industry. For 1935 continued progress is seen based on further improvements in automobile production and sales.

Tire manufacturers, in particular, are optimistic, their enthusiasm being based on the estimated production of 3,000,000 cars in 1935 compared with 2,400,000 in 1934, the latter figure being a 45% increase over 1933. That this estimate will be fulfilled seems assured since returns for January approach 300,000 cars with February production certain to reach 350,000. Such increases speak well for the 1935 original tire equipment market.

The replacement tire market, too, will show increased figures for 1935. Conservative estimates place 6,000,000 cars on the road today with smooth, worn tires, in itself a tremendous market. Another favorable factor is the small amount of tire stocks in the hands of dealers according to the Department of Commerce, these stocks being lower than at any point in the past four years.

Reports from manufacturers of rubber footwear and mechanical goods show greatly increased production schedules, with the former market in a most favorable position.

Rubber reclaimers also report operating at 1929 and 1930 levels as a result of increased demands for all grades of reclaims.

An interesting situation exists in the machinery division of the industry. There is an acute shortage of used rubber machinery. This is particularly surprising in view of the fact that dozens of rubber factories were forced into receiverships during the 1929-1933 period (during 1934 there was not a single bankruptcy reported among rubber manufacturers of any kind) with resulting public auctions flooding the market with used machinery. Naturally, such an existing condition will result in definite sales of new and original equipment including calenders, mixers, etc.

From practically every angle the rubber industry will show definite progress during 1935. Increased activity on the part of rubber manufacturers of course has already resulted in greater shipments by manufacturers and suppliers of rubber chemicals and compounding materials.

New Rubber Problem

Rubber engineers are faced with a new problem, one that requires a complete *volte face* for eventual solution. The new streamlined cars generate much more static electricity than the old models. This static electricity is caused by the wind sweeping over the front wheel bearings, the swishing of gasoline in the tanks, and at other friction points. Therefore, engineers face the problem of making rubber, one of the best insulators known, a conductor of electricity. Akron rubber manufacturers are experimenting with added carbon black in the rubber, infusing the rubber with copper, and other plans. K. D. Smith, technical director of the B. F. Goodrich tire division, reports success in the offing.

New Leather-Rubber Chief

Eugene W. Sloan was named chief of the Leather-Rubber Division of the Bureau of Foreign and Domestic Commerce on February 4. The appointment was announced by C. T. Murchison, Director of the Bureau. The new chief has been engaged in the shoe manufacturing business in St. Louis for the past ten years. He is a member of a family that has been associated with the shoe industry for many years. His experience in the shoe and leather business has been wide and varied and extended to export sales phases in addition to the domestic market. Mr. Sloan is a graduate of Princeton University. He served overseas with the American military forces occupying the post of captain in the field artillery.

LABOR SEEKS REMOVAL OF FIRESTONE "EAGLE"

An affidavit citing specific violations of Section 7-A of the National Recovery Act was filed on January 23 with the Regional Labor Board, at Cleveland, by the Firestone local of the United Rubberworkers' Union. The union seeks to have the "blue eagle" removed from the Firestone Tire & Rubber Company. Similar action is expected shortly from the Goodrich local of the union.

Originally called for January 31 at Cleveland the hearings have been postponed twice. Five members have been appointed to the regional labor board to hear testimony including a representative of the public, two labor leaders, and two business men representing industry. The specific charges against the company in the blue eagle removal attempt include the refusal of Firestone to bargain collectively with the union, the organization of the employes conference plan termed a "company union," coersion of employes, preference to "friendly" employes, and the fact that the "company union" is not a bargaining agency. Similar charges, it is understood, will be made against Goodrich.

Earlier in January members of the Firestone union, after a five-hour session, voted down a proposal to empower a committee to call a general strike at the factory. Instead of the strike action the delegates agreed upon the plan of attempting to remove the blue eagle from the company. Under the strike plan the walk-out would have been ordered if the company failed to make available its payroll lists for the election ordered last September by the National Labor Relations Board at Washington.

It will be recalled that both Firestone and Goodrich petitioned the United States Circuit Court of Appeals, at Cincinnati, to determine the right of the National Labor Relations Board to order employe elections at both of those factories. As a further development the employe organizations of Goodrich and Firestone petitioned the same court last month asking for a review and reversal of the same orders. The right of these later petitions has been challenged by both the A. F. of L. union affiliate and the Attorney General's office at Washington.

On January 22 Wendell Berger, special assistant to Attorney General Cummings, asked the Circuit Court of Appeals at Cincinnati to dismiss the petitions presented by the employe representation groups on the grounds they were not the "person or persons to which the orders demanding that pay rolls be supplied for holding labor representation elections." At this writing attorneys for both Firestone and Goodrich groups are battling the dismissal petition, and have forwarded a notice of their intentions to the Cincinnati court. Dismissal of the Firestone and Goodrich direct petitions on the elections ordered by the National Relations Labor Board is not being sought, but will be fought out in the court. It is probable that this case will not be heard for several months due to legal complications.

ORDER INVESTIGATION OF JAPANESE RUBBER SALES

Following repeated protests and complaints made by Representative Dow Harter, of Ohio, to the Federal Trade Commission, the Washington administration has ordered an investigation into the importation and sale of Japanese rubber goods in the United States. Last month Representative Harter accused administration officials with applying "red tape" to the complaints brought in the name of several rubber manufacturers in and around Akron.

On behalf of the Sun Rubber Company, of Barberton, Ohio, Representative Harter filed a specific complaint to the Commission on January 26 charging that certain New York importers are competing with Sun Rubber through "unfair methods of competition." The complaint alleged that these concerns obtain copies of rubber toys created and manufactured in the United States and send them to Japan for duplication. Within a short time, it is further alleged, Japanese manufacturers send to these importers quantities of the duplicated toys which are offered for retail sale at a lower price than the original American creations.

Among the importers named in the complaint were the New York Merchandise Company, Inc., Louis Wolf & Company, the Mitzui Company, Ltd., and four others, all of New York City. In addition to other charges cited these companies are also accused of merchandising the Japanese duplicated toys and novelties in methods designed to mislead the public in believing these duplicated items are American rubber products.

It is understood that several rubber manufacturers in this country have received questionnaires to fill out in detail their specific complaints which will be presented to the export division of the administration in the near future in an attempt to invoke provisions under the National Recovery Act to exclude Japanese importations as far as possible.

Hauser Voices Appreciation

Dr. Ernst A. Hauser, chief chemist of the Semperit Austro-American Works, of Vienna, who arrived in this country in early December and delivered addresses before several of the sectional rubber groups, wishes to express his thanks and appreciation through these columns to all the members of the rubber industry with whom he came into contact for their courtesies and hospitality. Dr. Hauser left for the West Coast in mid-January and will visit Japan and the Far East. He will be back in the United States later in the year on his return trip to Vienna.

Sherwin-Williams' House Organ

A new house organ, under the title of "Paint," has been introduced by the Sherwin-Williams Company, Cleveland, Ohio. Attractively printed in two colors the first issue consists of eight pages and features a pictorial review of various interesting events. The new house organ is to be distributed monthly to concerns and individuals interested in the products manufactured by the company which include industrial products applicable to many industries.

Discusses Paint Conditions

The latest issue of "The Dutch Boy Quarterly" (Volume 12, Number 4) house organ of the National Lead Company, discusses current conditions in the paint industry and includes an interesting article on how to use paint properly. Consisting of eight pages this issue is also replete with information on the uses of lead in connection with recent stratosphere flights. The Titanium Pigment Company, Inc., is a subsidiary of the National Lead concern.

REORGANIZE NEW YORK KELLY-SPRINGFIELD CO.

As paradoxical as it may seem the Kelly-Springfield Tire Company is and is not in receivership. To make it more explicit, there are two Kelly-Springfield companies, one a New Jersey Corporation, the other a New York Corporation. The former is still under receivership, both federal and state, while the latter, the New York corporation, which acts as an operating subsidiary, has been reorganized and the federal receivership dissolved.

Reorganization of the operating subsidiary was made possible when Judge Hulbert of the United States Court dissolved the receivership of which Frank C. Ferguson and Alexander Weinstein were co-receivers. In the reorganization proceedings the following officers were elected: Frank C. Ferguson, president of the Port of New York Authority, president; Joseph F. O'Shaugnessy, formerly vice-president of the U. S. Rubber Company, vice-president; Daniel O'Regan, vice-president; and Alexander Weinstein, secretary and treasurer. These elections apply only to the New York corporation.

Over in New Jersey Vice Chancellor Charles M. Egan, of Jersey City, on January 11, named permanent State receivers for Kelly-Springfield, the New Jersey corporation. These receivers are: Frank C. Ferguson (president of the reorganized New York company), Alexander Weinstein (secretary and treasurer of the reorganized subsidiary), Edmund Burke (Kelly-Springfield president prior to receivership actions), and Daniel T. O'Regan (vice-president of the reorganized concern and the prosecutor of Hudson County, New Jersey). This receivership is best described as a State equity proceeding designed to conserve the assets of Kelly-Springfield.

Under the federal receivership of the New Jersey corporation there are also two receivers, these being Alexander Weinstein and Joseph O'Shaugnessy. The latter official, in his capacity of vice-president of the reorganized New York subsidiary, stated that under the reorganization proceedings "the company is now in a position to move forward and take its proper place in the tire industry." Kelly-Springfield is one of the oldest tire manufacturers in the country.

In order to protect their interests two noteholder organizations have been formed in New York. One committee, headed by W. B. Stratton, and including Robert J. Levy, partner of the company of that name, and George Peabody, former Kelly-Springfield director, has named John M. Sheffey, 60 Wall Street, New York, as secretary. These committee members are said to own substantial amounts of outstanding notes.

Another committee for holders of $6.00 preference stock of Kelly-Springfield is headed by Spruille Braden, industrialist, and includes John L. Merritt and Walter Barnum, the latter being president of the Motor-Stoker Corporation. The secretary of this protective committee is F. G. MacLean, 25 Broad Street, New York City.

Reports persist in cropping up to the effect that as, if and when Kelly-Springfield survives its legal troubles it may be amalgamated or absorbed by the Lee Tire & Rubber Company of Conshohocken, Penna. The General Tire & Rubber Company has also been mentioned in this connection with persistent denials from officials of that company.

LOOKING FOR A JOB?
See Classified Ads—Page 263

DECEMBER CONSUMPTION 5.2% ABOVE NOVEMBER

Consumption of crude rubber by manufacturers in the United States for the month of December (1934) amounted to 36,662 long tons, which compares with 34,842 long tons for November (1934). December consumption shows an increase of 5.2% over November (1934) and 27.5% over December (1933), according to statistics released by The Rubber Manufacturers Association. Consumption for December (1933) was reported to be 28,757 (revised) long tons. Consumption of crude rubber during 1934 amounted to 453,905 long tons as compared with 401,000 long tons consumed in 1933 and 332,000 long tons consumed during 1932. 1934 consumption is the highest consumption for any one year with the exception of 1929 when 467,400 long tons were consumed.

Imports of crude rubber for December were 29,200 long tons, a decrease of 19.4% below the November figure of 36,233 long tons and 30.6% below the 42,099 long tons imported in December, 1933. Imports of crude rubber during 1934 amounted to 469,484 long tons as compared with 411,615 long tons received in 1933 and 400,787 long tons imported during 1932.

Total domestic stocks of crude rubber on hand December 31st were estimated at 352,632 long tons, which compares with November 30th stocks of 361,236 long tons and 365,000 long tons on hand December 31, 1933.

The participants in the statistical compilation report 47,644 long tons of crude rubber afloat for United States ports on December 31, 1934, compared wth 38,625 long tons afloat on November 30, 1934, and 55,606 long tons afloat on December 31, 1933.

December reclaimed rubber consumption is estimated to be 8,284 long tons; production 7,353 long tons; and stocks on hand, December 31, 1933, 23,079 long tons.

TRADE COMMISSION ENDS HEARINGS ON GOODYEAR

The extended hearings conducted by J. W. Bennett, examiner for the Federal Trade Commission, to determine whether the Goodyear Tire & Rubber Company violated the Clayton anti-trust laws in its contract with Sears, Roebuck & Company, were concluded in Washington, D. C., on February 1, after having resumed in that city on January 14. The hearings have been held in leading cities throughout the country. The hearings ended with the cross-examination by Goodyear defense attorneys of F. J. Corbin, commission accountant, on methods used in piling up differentials allegedly granted to the mail order house by Goodyear. This is one of the major points in the suit.

A decision will not be rendered for some time, however, since Examiner Bennett must make a report to the full Trade Commission, that body must review the tremendous pages of testimony, and then render its decision as to whether Goodyear is in violation of the anti-trust acts. Commission attorneys put sales to Sears-Roebuck at $37,457,000 less than cost to Goodyear dealers, while Goodyear attorneys put this figure at only $8,000,000, justifying the sales on the ground of quantity business.

The hearings set a record for volume of testimony with more than 25,000 pages presented since the trial opened. More than 400 witnesses were summoned in all, including retail tire dealers, competitive tire officials and rebuttal witnesses. The next largest case ever heard by the Federal Trade Commission was that against the Bethlehem Steel Company when 14,000 pages of testimony were in evidence.

Rebutting the claim of the Government that its contract with Sears-Roebuck may "tend to create a monopoly" Goodyear attorneys introduced B. R. Prall, tire department manager of Montgomery, Ward & Company, who testified that Harvey S. Firestone offered to negotiate a contract with his company to make tires for them. When government attorneys objected to Mr. Prall, defense attorneys stated that if allowed to testify further he would state that Firestone had proposed a five-year cost-plus contract agreement with Montgomery-Ward.

Another important defense witness was George O. May, senior partner of Price, Waterhouse & Company, noted accounting firm of New York, who testified that it was improper to pro-rate Goodyear's selling and advertising expenses against Sears' tires made by Goodyear to show the differential or discrimination between prices given by Goodyear to its dealers and to Sears-Roebuck, as the Government attempted to do.

There are two decisions possible for the Federal Trade Commission to hand down, approving the contract in its present form or to order Goodyear to cease operating under present agreements with Sears-Roebuck. In the event an adverse decision to Goodyear is given the case will probably be carried into months and years since Goodyear will in all probability appeal the case until it reaches the Supreme Court.

TIRE SHIPMENTS SHOW 6% GAIN OVER OCTOBER

Shipments of pneumatic casings for the month of November, 1934, amounted to 3,191,102 casings, an increase of 6.0% above October, 1934, and 45.2% over November, 1933, according to statistics released by The Rubber Manufacturers Association, Inc.

Production of pneumatic casings for November, 1934, amounted to 3,340,859 casings, an increase of 1.6% over October, 1934, and 9.9% above November, 1933.

Pneumatic casings in the hands of manufacturers on November 30, 1934, amounted to 8,778,989 units, an increase of 1.4% above stocks on hand on October 31, 1934, but were 5.1% below stocks on November, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
Nov., 1934	3,191,102	3,340,859	8,778,989
Oct., 1934	3,009,714	3,286,902	8,656,799
Nov., 1933	2,197,485	3,039,386	9,246,563

New du Pont Laboratory

E. I. du Pont de Nemours & Company, Wilmington, Delaware, has announced the formation of a new medical research laboratory to be known as the Haskell Laboratory of Industrial Toxicology. The purpose of the new laboratory is to thoroughly test all products manufactured by du Pont from a health standpoint prior to their release on the market. Dr. W. F. von Oettingen has been named as managing director.

FEEDING GUAYULE PLANTS INTO CUTTING MACHINE

Equipment which cuts, picks and chops guayule plants during harvest season.

Guayule plants cultivated by the Continental Rubber Company, of New York, on California soil, are harvested after four years of growth. At harvest time the plants are cut and picked by a special tractor-drawn machine that feeds them into a cutting device in which they are chopped to bits and blown into a truck that travels behind the harvester. The chopped plants are later put through several treatments to release the rubber, which runs from 14 to 19%, and are then pressed into 200-pound blocks. The above scene depicts the harvesting action on a Continental rance [Photo from "Caterpillar" News Bureau, Peoria, Ill.]

Names in the News

E. J. COUGHLIN, vice-president and director of the U. S. Rubber Company, completed 45 years of service with that company last month. He entered the services of the company as a shipping clerk and has held his present position since April, 1929.

J. U. RANDLE has been appointed special sales representative of the General Tire & Rubber Company, Akron, in the Cleveland and Northern Ohio territory. He has been associated with the tire industry for more than 15 years.

DR. E. R. A. MERCWEATHER, medical inspector of factories for the Midland Area, of England, addressed members of the Institution of the Rubber Industry on January 21 in Birmingham (England) on "Risks in the Rubber Industry."

E. L. MEFFORD has been promoted to general manager of the Cleveland (Ohio) district by the Goodyear Tire & Rubber Company, Akron. He has been with the company for several years.

J. D. TEW, president, B. F. Goodrich Company, Akron, rounded out his thirtieth year of activity with the company last month. He spent the day (or part of it) reminiscing with EVAN J. EVANS in whose compounding department he started his Goodrich activities.

E. J. THOMAS, general superintendent, Goodyear Tire & Rubber Company, Akron, has been transferred to the Goodyear plant at Wolverhampton, England. He sailed last month to take up his new duties abroad.

J. P. SEIBERLING, vice-president, Seiberling Rubber Company, Akron, addressed a meeting of the Mahoning County Automotive Association on January 22 at Youngstown, Ohio.

C. A. STILLMAN, vice-president, Goodyear Tire & Rubber Company, Akron, was elected to the board of directors of the Akron Better Business Bureau on January 9.

F. H. BANBURY, manager of the Banbury Mixer Department of the Farrel-Birmingham Company, Inc., Ansonia, Conn., left on January 12 for a ten weeks trip in Southern and Western States and Mexico. He will call on rubber manufacturers in various sections of the country after a short vacation in California.

JOHN W. THOMAS, president, Firestone Tire & Rubber Company, Akron, was awarded a 15-year veteran pin by the Boy Scout Council of the Akron Area on January 24.

ALTON MICHAELS, a Goodyear employee for the past ten years, has been put in charge of the Goodyear Tire & Rubber Company plant in Gadsen, Alabama.

J. R. KEACH has been appointed purchasing agent of the Ohio Rubber Company, Willoughby, Ohio. He replaces O. B. WAITE, who resigned to become associated with an Akron concern. Mr. KEACH was formerly associated with Firestone.

ED LOWRY, who has been associated with rubber companies for the past several years, has been appointed Toledo (O.) territory manager for the B. F. Goodrich Company.

CYRUS S. CHING, director of industrial and public relations, U. S. Rubber Company, New York City, was the principal speaker at the 16th annual dinner of the Rhode Island Textile Association held in the Biltmore Hotel, Providence, on January 31.

R. J. ARENS has succeeded HAL HOOVER, public relations director, as president of the Generator Club, composed of office and key men of the General Tire & Rubber Company, Akron. He was elected on January 25.

CLIFTON SLUSSER, factory manager, Goodyear Tire & Rubber Company, Akron, discussed "Water and Labor" at an open meeting of the Akron Board of Trade on January 22.

C. M. PIPER, at one time general sales manager for the Fisk Rubber Company, later associated with Goodyear, has been named vice-president of Kemitex Products, Inc., Wadsworth, Ohio.

CARL W. COCKRELL, traffic manager, Seiberling Rubber Company, Akron, has been authorized by the Interstate Commerce Commission to practice law before that body.

H. I. BELKNAP, associated with Goodyear for many years, has been transferred to the Java plantations for the next several years. He sailed with Mrs. BELKNAP last month to take up his new duties.

HARRY L. FISHER, associated with the Development Department of U. S. Rubber Products, Inc., Passaic, N. J., gave an illustrated lecture on "The Chemistry of Rubber, Gutta-Percha, and Balata Hydrocarbons" before the Rhode Island Section of the American Chemical Society at Providence on January 10.

LELAND SHEPHERD, former branch manager of the Goodyear Tire & Rubber Company at Chicago, has been transferred to Akron where he becomes assistant sales manager of the tire division.

E. P. WECKESSER, sales executive of Associated Tire Lines division of the B. F. Goodrich Company, Akron, was transferred to the automobile tire division of Goodrich. He has been in the tire industry since 1916.

T. G. GRAHAM, vice president, B. F. Goodrich Company, Akron, has been named chairman of the Ohio State Relief Commission. He is also Committee Chairman of the Summit (Ohio) County Relief Board.

EVERETT G. HOLT, assistant chief of the Leather-Rubber Division of the Bureau of Foreign and Domestic Commerce, gave an address generally covering the rubber industry before members of the Foreign Trade department at Washington, D. C., on February 4.

Another Medal For Nieuwland

Father Julius A. Nieuwland, Professor of Organic Chemistry, Notre Dame University, South Bend, Indiana, was awarded a gold medal for his discovery of the synthetic rubber process, at the annual dinner of The American Institute held on

February 7 at the Hotel Astor in New York City. This is the second award earned by Father Nieuwland for this discovery, the first being the William H. Nichols medal to be presented to him by the New York Section of the American Chemical Society. Dr. Carl D. Anderson, of the California Institute of Technology, was also presented with a gold medal by The American Institute for his work in connection with the discovery of the positron, described as a new fundamental unit of matter.

Kratz Joins Vultex Chemical

George D. Kratz, well-known rubber chemist, has joined the Vultex Chemical Company, of Cambridge, Mass., and will represent that company in the Metropolitan territory in a sales and technical capacity. Mr. Kratz will have charge of the New York office located at 125 Duane Street. The telephone number is WOrth 2-6417.

CHARLES R. HAYNES, recently associated with the U. S. Rubber Company, has joined the Rubber Chemicals Division of the Binney & Smith Company, New York. At one time he was factory manager of the Boston Rubber Shoe Company.

PAUL W. LITCHFIELD, president, Goodyear Tire & Rubber Company, Akron, discusses the importance of social insurance legislation in the February 9 issue of *Today*, the new national weekly magazine.

EDWARD P. MITCHELL has joined the Thermoid Rubber Company as Pacific Coast representative. He has been with the Gilmer Company for the past ten years.

DR. HAUSER ADDRESSES THE LOS ANGELES GROUP

Dr. Ernst A. Hauser, chief chemist of the Semperit Austro-American Rubber Works of Vienna, addressed 165 members of the Southern California Section of the American Chemical Society at the auditorium in Barker Brothers, Inc., Los Angeles furniture store, Monday evening, February 4, on the subject, "Latest Developments in Rubber and Rubber Latex." The auditorium meeting followed a dinner meeting at the Mary Louise Tea Room adjoining the building. One hundred twenty-five attended the dinner meeting.

Dr. Hauser was introduced by W. R. Hucks, chairman of the Los Angeles Rubber Group of the American Chemical Society, Mr. Hucks having been presented by Marion E. Dice, chairman of the Southern California Section of the American Chemical Society.

Dr. Hauser's address, in addition to outlining recent developments in rubber and rubber latex, sounded an optimistic note for the future of the industry. His subject was so well covered in the one hour talk that practically no questions were asked when the floor was thrown open for questions.

Leaving for San Francisco on February 5, Dr. Hauser took passage on an ocean liner for Japan where he will spend six weeks.

During a very brief business session the following members of the golf committee for the ensuing year were elected by the Group: B. E. Dougherty, president, B. E. Dougherty Company (chairman); R. Bienvenue, Firestone Tire and Rubber Company of California; A. W. Phillips, B. F. Goodrich Company, Pacific Division; J. E. Warden, Goodyear Tire and Rubber Company of California; and W. V. Brady, United States Rubber Company, Samson Division.

RUBBER ABSORPTION HITS ALL-TIME RECORD IN 1934

World absorption of crude rubber during 1934 reached the all-time record figure of 930,000 tons. According to the Leather and Rubber Division of the Department of Commerce this is 15% higher than the total reached in 1933, the previous high record. The Division points out that since the use of rubber is correlative and dependent upon several allied industries the present use of rubber augurs well for world economic recovery.

The United States participated in the increased use of crude rubber, consuming about one-half of world total in both 1933 and 1934, despite the fact that there has been a considerable development of United States tire manufacturing plants in various foreign countries. A recent compilation shows that there are at least seventy tire manufacturing plants in foreign countries, of which nearly one-third are either United States branch factories or associated with American companies.

Total world rubber absorption reached the high point of 808,000 tons in 1929, declined 12 per cent to 710,000 in 1930, declined 5 per cent to 678,000 in 1931, increased 1 per cent to 686,000 in 1932, increased 18 per cent to 809,000 in 1933, and increased 15 per cent to 930,000 tons in 1934.

The 1934 figure is believed to be a conservative estimate which might possibly be raised when complete 1934 statistics are available for a few additional countries.

Zinc Oxide Plant on Coast

Rubber manufacturers of the Los Angeles area are showing interest in the new 18-acre plant of the Hughes-Mitchell Processes, Inc., now nearing completion at Torrance, a Los Angeles suburb. Zinc oxide will be the principal material manufactured in which the rubber men will be interested, but various other zinc and lead compounds also will be turned out. Raw materials will be purchased from sources as near the west coast section as possible and the expectation is that from 50,000 to 60,000 tons of raw material will pass through the plant annually. W. H. Rose is president of the corporation and A. Mitchell is vice-president and technical director. Present plans are to have the plant in full operation by midsummer. An investment of one million dollars is reported.

Hold Coast Golf Tournament

At the winter golf tournament of the Los Angeles Rubber Group of the American Chemical Society held at the Montebello Golf Club, January 19, with 28 players participating, H. B. Gurley of the B. F. Goodrich Company, Pacific Division, captured the trophy. The next tournament will be held in April at a date not yet determined.

RSL Moves Its Offices

Rubber Service Laboratories Company, a division of the Monsanto Chemical Company, has moved its executive offices from the Peoples Saving & Trust Building, Akron, to 1012 Second National Bank Building, that city. The company manufactures a wide range of chemicals for the rubber industry.

Sears-Roebuck Modifies Ads

Under stipulated agreement with the Federal Trade Commission, Sears, Roebuck & Company, the mail order house of Chicago, will modify advertising claims recently appearing in connection with their "All-State" line of tires, produced for them by Goodyear. Among the claims criticized by the Commission were the statements referring to the use of All-State tires by 12,000,000 families, and that 9 out of 10 motorists choose this particular brand.

Index to ASTM Standards

Designed to be of service in determining whether the American Society for Testing Materials has issued any specifications or test methods on particular materials or subjects, that organization has issued an Index, as of January 1, 1935. 142 pages in size this index is available to those interested without charge.

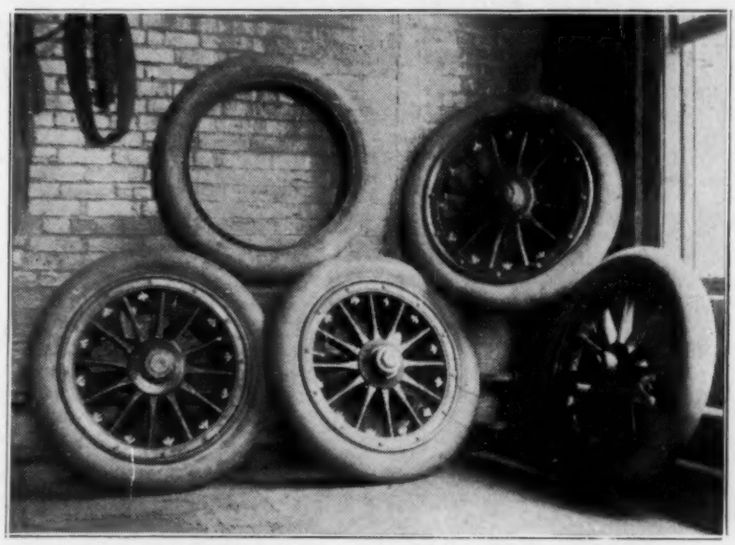
Planning "Largest" Balloon

Definite announcement has been made that the Goodyear-Zeppelin Corporation, Akron, will soon start construction on the "world's largest" balloon yet conceived. It will be 3,700,000 cubic feet in size. This mammoth balloon, when completed, is to be inflated with helium instead of the usual oxygen so that it may be used in flights into the stratosphere.

Smith Enlarges Factory

The E. M. Smith Company, 637 S. Clarence Ave., Los Angeles, makers of rubber belting, has completed a factory addition 80 x 120 feet in dimensions. New installations include a No. 27 Banbury mixer.

FIRST PNEUMATIC TIRES BUILT BY GOODRICH IN 1896



Reproduction of the first pneumatic tires manufactured for use.

Modern production methods make it possible to turn out thousands of tires daily. But picture the painstaking effort and time put behind the late Alexander Winton's order for a set of pneumatic tires back in 1896! Mr. Winton, one of America's pioneer automobile manufacturers, ordered the tires from the Goodrich factory for use on the first Winton model, and actually paid for the molds used in making the tires. The above reproduced photograph was uncovered recently by C. E. Bonnett, of Cleveland, general manager of the Tire and Rim Association. Mr. Bonnett was a Goodrich employee from 1901 to 1910 and was given the photograph by the late Scott Alkire in 1902. It is reproduced here by the courtesy of the B. F. Goodrich Company.

Foreign News

BRAZIL

Exports Show Marked Increase

The quantity of rubber exported from Brazil during the first 9 months of 1934 was the largest recorded for any similar period since 1931, according to a report from U. S. Assistant Trade Commissioner A. A. Barrington, of Rio de Janeiro. Owing to the higher value of the product, the value of shipments was in excess of the combined value of exports in the corresponding periods of the 2 preceding years. Total rubber shipments from Brazil in the January-September period of 1934 amounted to 7,871 metric tons, valued at 24,295 contos, as compared with 6,651 tons valued at 15,114 contos, in the corresponding 1933 period, and 4,208 tons valued at 7,269 contos in the 1932 months.

To Make Seiberling Tires

An agreement has recently been entered into between the Cia. Brasileira de Artefactos de Borracha, a small manufacturer of tires and tubes under the trade name of "Caballi," with a factory in Rio de Janeiro, and the Seiberling Rubber Company of Akron, Ohio. Under the terms of the agreement production facilities of the Brazilian factory will be enlarged and expanded and placed under the supervision of technical experts and engineers from the Seiberling factory in Akron. The tire to be manufactured by the combined interests will be termed "Brazil" tires and will incorporate Seiberling tread designs.

GERMANY

Regulate Rubber Production

With rubber growing more scarce for industrial purposes the German government has issued a new regulation reducing the percentage of rubber for insulating purposes on cables and electric wires. The regulation, enforced by the rubber control authorities, also forbids the use of rubber entirely for certain types of electric wire. These restrictions, however, do not apply to articles manufactured for export purposes.

HOLLAND

Factories Reduced Activities

According to the 20th official report on Dutch Indian native rubber the percentage of dry marketable native rubber exports was 41.5% in July, 44.4% in August, 34.7% in September and 37% in October. These percentages illustrate the reduced activity of the remilling factories in the Dutch East Indies. The report also states that the registration of trees, undertaken in connection with the restriction scheme, is making good progress in the various districts.

December Exports Rise

Contrary to expectation exports of native and estate rubber from the Dutch East Indies have assumed fairly large proportions. Figures made available by the Central Bureau for Statistics at Batavia reveal a total export of 34,068 tons during December, 1934. Of this amount 22,483 tons were of estate rubber, the balance native rubber. The increase is believed due to the fact that to date estate exports have remained considerably below the export quota permitted under the restriction scheme.

INDIA

Ceylon Exports Increase

During the month of December, 1934, Ceylon exported 8,481 tons of rubber compared with exports of 6,376 tons in the preceding month. In October exports amounted to 6,918 tons. Of the December total 3,779 tons were sent to the United States, against 2,774 in November and 3,369 tons in October.

Rubber Plant Near Completion

Under the direction of Mr. J. Helen the rubber factory being erected under government supervision in Travancore, India, is rapidly nearing completion. According to Mr. Helen the new factory will manufacture tires and tubes, toys, tiles, footwear and fabrics, among other rubber goods. The dimensions of the factory are 198 x 100 feet. It is accessible by both railroad and steamship. Machinery for the new factory was expected late in February with production scheduled for delivery of initial products by April.

RUSSIA

Plan Third Rubber Factory

With two rubber factories now in operation, one in Moscow and the other in the Southern Kazakstan region, the U.S.S.R. has scheduled a third for construction in Uzbekistan in the near future. The two present factories use rubber supplied chiefly by their own plantations. During 1934 both factories were scheduled to produce 100 tons of rubber each, which amount is to be increased to 200 tons each in the current year.

Producing Natural Rubber

For the first time natural rubber is being produced in quantity in Turkmenistan, Russia. 200 tons were shipped to Soviet factories from the Kara-Kalinsky State rubber plantation last month. This rubber is secured from guayule plants which have been cultivated since 1932. These plants grow wildly in abundance throughout the Turkmenistan region.

A New Synthetic Rubber

According to the January 10 news edition of *Industrial and Engineering Chemistry* a factory has recently been completed in Leningrad for producing a new synthetic rubber in quantity. This synthetic rubber is known as "Sowpren" and is said to show 50% less wear when tested under conditions similar to those used with natural rubber. These tests also show that it is less permeable to gases than natural rubber. "Sowpren" is also said to show resistance to acids and is particularly resistant to petroleum and oxygen.

Offer Sales Representation

The Chemical Research Laboratories, Inc., of Pittsfield, Massachusetts, distributors and manufacturers' representatives for a varied line of industrial chemicals in the New England territory, advise that they are seeking additional lines to represent including rubber compounding materials and chemicals. The company, of which Paul W. Maynard is president, maintains warehouses and offices in Pittsfield.

Clapp Rubber Plant Sold

Following a receivership, the factory of the E. H. Clapp Rubber Company, Hanover, Mass., one of the oldest rubber reclaiming companies in this country, was sold at auction last month. A total of $122,000 was realized by the auctioneers from the following parcel sales: equipment, $77,000; buildings, $9,000; other equities, $25,000; dwellings, $11,000. A bid of $65,000 for the entire assets of the defunct concern was rejected by the receivers, prior to the auction, on the grounds of insufficiency.

Davol Rubber Club Feted

Fifty-eight members attended the recent jubilee dinner of the Davol Rubber Company's Quarter Century Club at Providence, Rhode Island. The banquet, held at the Narragansett Hotel, marked the sixtieth anniversary of the Davol Rubber Company and the fifteenth anniversary of the Quarter Century Club. Each of the members was presented with a handsome gift by the company. Among the speakers were Charles J. Davol, president, Ernest I. Kilcup, managing executive, and Walter L. Davol, assistant managing executive, and R. J. Fries, sales manager.

INTERNATIONAL PULP CO., *41 Park Row, New York, N.Y.*
SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER
Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.
LIBERAL WORKING SAMPLE FURNISHED FREE

SUGGEST AMENDMENTS TO RUBBER FABRICS CODE

The Code Authority for the Rubber Manufacturing Industry recently submitted an application to NRA officials requesting the amendment of the Code of Fair Competition as it affects the automobile fabrics, proofing and backing division of the industry. Public hearing on the suggested revisons was set for January 15, before Assistant Deputy Administrator J. H. Lenaerts, in the Department of Commerce Building, at Washington, D. C.

The amendments would add a paragraph forbidding a "contract or order for future delivery—with an automatic cancellation clause included" provide a new section on sales terms, and bring proofing and backing jobbers and distributors under 10 of the chapter's trade practice provisions, and under the code's ban against sales below cost.

Another amendment would delete the provision forbidding a member of the industry to "coat or combine customer's auto topping fabrics to be used in the replacement trades." The provision has been stayed almost continuously since the code's approval, and has been found to work an undue hardship on some interests.

An amendment on sales terms would permit a two per cent discount from the invoice price, net payment 40 days from the date of shipment or the date of invoice, whichever is earlier, "except that the maximum terms for goods billed and shipped to customers in the States of California, Oregon and Washington from points east of the Mississippi shall be net 70 days."

The present section permits a 2 per cent discount for payment within 35 days, and makes no allowance for shipments to California, Oregon and Washington.

On December 20 the National Industrial Recovery Board announced its approval of an administrative order making uniform throughout the industry code provisions prohibiting members from selling below individual cost, except to meet a competitor's price "in good faith." Four sections of the rubber industry—automobile fabrics, rubber footwear, mechanical rubber goods and rubber rainwear—have discarded the code clause with regard to costing provisions, which prohibited members from selling below the cost of the most efficient producer, and have substituted the individual cost formulae in keeping with the new administrative order.

Three members of the Code Authority of the Rubber Footwear Division of the Rubber Manufacturing Industry were approved by NRA officials on December 11. They are J. F. Muffley, Endicott Johnson Corp., C. E. Little, Servus Rubber Company, and T. J. Needham, U. S. Rubber Company.

CHICAGO RUBBER GROUP HEARS HAUSER ADDRESS

More than 100 were present at a special meeting held by the Chicago Rubber Group on January 30 at the Hotel Sherman called for the express purpose of presenting Dr. Ernst A. Hauser, chief chemist of the Semperit Austro-American Rubber Works, of Vienna, who is in this country on an extended visit. The meeting was preceded by a dinner in the College Inn of the hotel and entertainment was provided by a special Viennese Ballet performed in honor of the visiting chemist.

Dr. Hauser discussed the "Latest Developments in Rubber and Rubber Latex." So vivid was the discussion after the address that the speaker was obliged to give a second talk to answer all of the questions presented by his listeners. According to B. W. Lewis, secretary of the Chicago Rubber Group, Dr. Hauser may present another address before members and their guests in the early future, probably on the chemist's return from Japan and the Far East where he intends to spend some time next month.

India Tire Plant Busy

With all charges of management inefficiency conquered in the courts, plus the securing of a loan of $190,000 from the Reconstruction Finance Corporation of Washington, D. C., the India Tire Company, Mogadore, Ohio, has settled down to definite production. The loan, one of the largest made to an industrial organization, covers the full amount of the plant mortgage, according to W. G. Klauss, president. Orders have piled up at the India factory and the company expects to double its working force to catch up. The original loan requested by Mr. Klauss was $350,000, there being a possibility that an additional loan might bring it up to that amount.

Purchase Chamberlain Corp.

The American Wringer Company, Woonsocket, R. I., manufacturers of rubber rollers and similar products, has acquired a controlling interest in the Chamberlain Corporation of Waterloo, Iowa. The latter concern manufactures "Washington" machine wringers.

Harris to Handle Summit Sales

Stanley W. Harris, formerly president of the National Rubber Machinery Company, is now exclusive sales agent for the Summit Mold & Machine Company, Akron, Ohio, manufacturers of individual tire and tube vulcanizers, engraving machines, molds, etc. Mr. A. S. Michelson, also formerly associated with National, is now with Mr. Harris.

Reorganizing Inland Rubber

All creditors of the Inland Rubber Company, Chicago, are required to file their claims with Special Master Edmund D. Adcock, 7 South Dearborn Street, Chicago, on or before February 28 next. Unless creditors file their claims prior to such date they will not be permitted to participate in the reorganization plans now being made for the Inland concern. Reorganization will be effected under Section 77B of the Bankruptcy Act of 1934. Further information may be obtained from A. D. Plamondon, permanent trustee, at 33 N. LaSalle Street, Chicago.

Mathieson Alkali Moves

Executive offices of the Mathieson Alkali Works, manufacturers of alkali and chemical products for the rubber industry, have been moved to 60 East 42nd Street, New York City, where it occupies three floors. The company recently completed construction of a new $7,000,000 plant at Lake Charles, Louisiana.

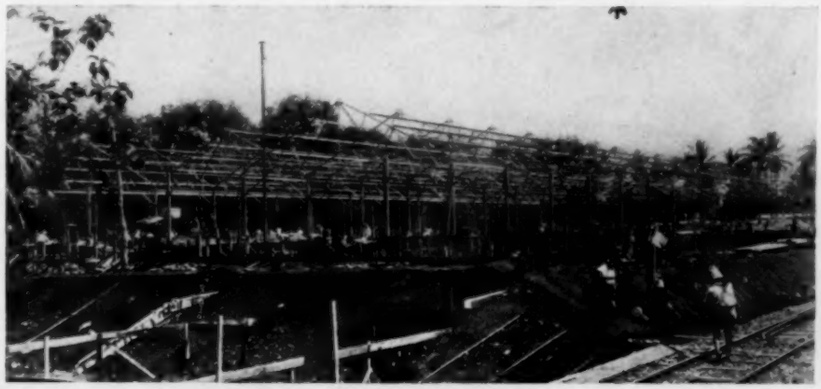
Carbon Black in Canada

According to a report from the Canadian National Research Council, the waste natural gas of Turner Valley, in Canada, is capable of yielding carbon black equal in quality to that now used by Canadian rubber manufacturers. The report also states the "tar sands" of Alberta can be suitably treated to produce a bitumen for use in rubber manufacture.

Rubber Growers' Moves Offices

Offices of the Rubber Growers' Association, Inc., have been moved from 2 Idol Lane, Eastcheap, London, E. C. 3 to 19 Fenchurch Street, London, E. C. 3, England. The three affiliate organizations associated with this association, i.e., the Rubber Producers Research Association, Rubber Roadways, Ltd., and the Crepe Sole Rubber Association of London, are also located in the new quarters.

GOODYEAR TO OPEN JAVA RUBBER FACTORY IN MAY



A view of construction activity on the Goodyear factory in Java.

With construction on the new Goodyear rubber factory in Java already a month ahead of schedule, officials of the company declare that the formal opening will be held sometime in May. This factory will be the second substantial investment of Goodyear in the Far East the company already operating rubber plantations in the Netherland Indies totalling almost 100,000 acres. Upon completion of the factory in Java R. W. Hadley, who has been associated with Far Eastern export sales for many years, will be managing director. Other officials and assistants have also been seelcted including several from the Goodyear "Flying Squadron."

Financial News

GENERAL TIRE PROFIT AMOUNTS TO $679,198

General Tire & Rubber Company, Akron, reports a net profit of $679,198.69 for the year ended November 30, 1934. The company showed an increase of nearly $4,000,000 in gross sales during the year. The profit reported is equal to $5.79 per share on the common stock, after provision for federal income taxes, as compared with payments of $2.67 per share in 1933 and 15 cents per share in 1932.

Total sales reported were $19,881,022.52 compared with $16,197,862 in the preceding year. Current assets on November 30 were listed at $7,099,647.20 against current liabilities of $1,194,498.85, in the ratio of 6 to 1. General retired $127,800 of its 6% cumulative preferred stock during the year outstanding stock now amounting to $2,986,700.

All members of the board of directors and incumbent officers of the company were re-elected. The officers are W. O'Neil, president; C. J. Jahant, vice-president; W. E. Fouse, vice-president and secretary; Charles Herberich, treasurer; T. Spencer Shore, assistant treasurer; and H. R. Jenkins, assistant secretary.

O'SULLIVAN RUBBER HAS NET PROFIT OF $58,808

The O'Sullivan Rubber Company, Inc., maintaining factories in Winchester, Virginia, showed a net profit of $58,808.69 for the six months ending June 30, 1934, and not $493,824 as erroneously reported in this column in our previous issue. This profit is equal to 28 cents a share on 213,333 shares. In the previous year O'Sullivan showed a net profit of $36,388.

Gross sales for the 6 month period, less returns and allowances, amounted to $812,981.71, with net sales amounting to $748,826.75. Current assets as of June 30, 1934, were set at $541,615.42 against current liabilities of $245,244.90, a ratio of 2 to 1.

SEIBERLING SHOWS LOSS; SECURES $250,000 LOAN

The Seiberling Rubber Company, of Akron, and subsidiaries, shows a net loss for the year ending October 31, 1934, of $546,689 after deducting expenses, depreciation and other charges. In the previous fiscal year the company showed a loss of $334,116 after deducting the usual charges.

On February 5, the Reconstruction Finance Corporation announced a loan of $250,000 to Seiberling Rubber at 6% interest. According to J. P. Seiberling, vice-president, this represents the participation of the RFC on behalf of closed banks in the renewal of approximately $800,000 in debentures, arranged in November, 1934. He further stated that banks holding the Seiberling obligations have taken the position of renewing these debentures if closed banks holding part of the notes would handle their share. Since the RFC holds most of the assets of closed banks they agreed to the renewal.

Although described as a "loan" no new money will be received by Seiberling in the transaction.

Re-elect Henderson Officials

At the first annual meeting of stockholders of the Henderson Tire & Rubber Company, Bucyrus, Ohio, held on January 21, the board of directors and incumbent officers were all re-elected unanimously. The board consists of F. L. Hopley John Shunk, William C. Beer, W. J. Schwenk and C. O. Henderson, manager of the factory. The company is busily engaged turning out tires for the export market including 1,000 tires each week consigned to the Welch Tire Company of London, England.

Dayton Rubber Has Loss

Dayton Rubber Manufacturing Company, Dayton, Ohio, reports net loss of $80,819 after depreciation, interest, taxes and other charges were deducted, for the year ended October 31, 1934. In the preceding fiscal year the company reported a net profit of $183,239. Despite the loss J. V. Aguirre, export manager, reports that 1934 export sales of Dayton tires and tubes were the largest in the past four years. Net sales were 37% higher in dollar volume than in 1933 and 63% ahead of 1932. During the year the export division opened 44 new accounts in 35 export markets. He also reported that no credit losses have been sustained since 1930.

General Given $32,683 Refund

General Tire & Rubber Company, Akron, received a refund of $32,683 in taxes paid to the Government last year, according to a report made public on February 4. The General Tire & Rubber Export Company also received a tax refund of $1,669. Harvey S. Firestone, Sr., received a personal refund of $5,770.

Exchange Issues Second Report

The second annual report, dated November 30, 1934, has been issued by the Commodity Exchange, Inc., compiled by Jerome Lewine as president of the Board of Governors.

NEW ENGLAND NEWS

The Warner Brothers Company, Bridgeport, Conn., this month launched another nationwide newspaper advertising campaign on its "Le Gant" corsets, featuring "Youthlastic," a Lastex two-way stretch fabric. This company was one of the first to use lastex thread in the manufacture of corsets, and the success which greeted introduction of the line late in 1931 has been followed by steadily increasing demand.

Members of the United Rubber Workers' Union employed by the Fisk Rubber Corp., Chicopee Falls, Mass., have voted to seek a general 20 per cent wage increase, following an analysis of wages paid by other rubber manufacturers and of living costs. The plant now employs about 1,500 hands, producing approximately 7,000 tires per day. An early increase in production is forecast.

About 200 employes of the waterproof department, United States Rubber Products, Inc., Naugatuck, Conn., have been transferred to the canvas department where production schedules have been jumped, according to Walter H. Norton, factory manager. Nineteen conveyors are being put into operation in the tennis mill instead of 16 as had been planned originally, it is understood.

A. F. of L. organizers have been busy in Naugatuck recently, and plans have been announced for the establishment of a permanent organization of U. S. Rubber employes. Several meetings of workers have been held.

The Raybestos Company, Bridgeport, Conn., is erecting a new building at its plant on Railroad Avenue, Bridgeport. The structure, of brick, steel and concrete construction, will cost $11,500.

Jenkins Bros. Company, Bridgeport, Conn., mechanical rubber goods, has added 100 men to its force and has been operating three shifts, according to Bernard J. Lee, vice-president. The company now employs about 450 hands. Mr. Lee said the plant was "very busy," but could not say how long it would continue so.

Thomas Gibbons, sales manager, Seamless Rubber Company, New Haven, Conn., was tendered a testimonial dinner January 28 at the Hotel Garde, New Haven, and was the recipient of a gift. He married Miss Mary Lauttenbach of East Haven, Conn., on December 15.

SCRAP RUBBER
HARD RUBBER DUST
CRUDE RUBBER
Main Office:
608 Akron Savings & Loan Bldg.
AKRON, OHIO
A. Schulman Inc.
Warehouses in Both Cities
Branch Office:
576 No. 20th Street
EAST ST. LOUIS, ILL.

New Rubber Goods

U. S. Rubber "Zipcord"

The Wire Division of the U. S. Rubber Company has developed a new lamp cord with a "zip" construction which permits easy and safe opening of the sheath and separation of the conductors. Known as

"Zipcord," the new product consists of two parallel conductors, and is rubber jacketed. When the conductors are pulled apart the rubber jacket divides evenly assuring perfect insulation for each conductor. It is protected by thick walls of rubber compound and may be stripped down without danger of impairing the dielectric properties of the individual conductors. "Zipcord" has been approved by the Underwriters Laboratories, Inc.

Dunlop New Non-Skid Tire

Dunlop Rubber Company, Ltd., of Birmingham, England, has introduced a new non-skid tire under the trade name of "Dunlop 90." The tread of the new tire is built upon a foundation of cords completely insulated with rubber. It is equipped with sharp edges which bite through road grease and dirt firmly holding to the surface of the road. In appearance this model resembles those of modern car design. It is not intended to supersede the triple stud tire featured by Dunlop, but is offered as an alternative tire.

Endicott Johnson Tennis Shoe

One of the new models in the Endicott Johnson line of tennis shoes for the cur-

rent year is known as "Big Chief." A novel effect is secured in the rubber soles by means of cut-outs. The shoe is also equipped with genuine leather ventilated insoles. Other features include colored underlays, heavy foxing around the soles, triple arch stays and inner foxing. Furnished in three colors—white duck, suntan and brown.

Watson Rubber Stem Tube

The Watson Rubber Stem Tube Company, of Indianapolis, Indiana, recently introduced a stem tube made entirely of rubber with the exception of the valve and the non-leak valve cap. Because of the removal of the hex-nut it is reported that 30% of all tube leakage is removed. The Watson-Type tube holds air three to four times longer than the ordinary metal stem tube, according to its manufacturers. The increased use of rubber makes the stem tube thoroughly flexible, the stem withdrawing through the rim hole in the event of a tube puncture, preventing the stem from tearing out of the tube or the pulling apart of the tube at this point. It also minimizes the possibility of injury to tube or casing. The company is also offering a rubber replacement stem which is easily vulcanized on as a replacement for the ordinary metal stem.

Golf-On Device Uses Rubber

An interesting device to transform ordinary footwear into golf shoes, a boon to golfers in general, is being merchandised under the trade name of "Golf-Ons" by the

Golf-On Company of Richmond, Virginia. This device is a rubber plate with spikes securely fastened into it. It is affixed to any ordinary shoe by being placed over the forward part of the sole, stretched into position by pulling on a button hook inserted in an eyelet in the back of the rubber plate, this action stretching the rubber sufficiently to slip over the sole of the instep. Release of the pulling pressure fastens it securely in place. Several features are claimed by the manufacturers including: four different sizes, acting as a non-skid agency even when the pleats are worn out, and enabling the traveler to omit golfing shoes from his equipment by carrying along Golf-Ons. It is also said that Golf-Ons give an absolute stance for golfers by tending to throw the weight toward the heel, an important principle in golfing.

Pump Uses Rubber Casing

On the basis that ability to handle acids and corrosive chemicals without difficulty is the first requisite of a centrifugal pump, the American Hard Rubber Company, New York, has introduced a new model known

as the "WAM Pump" equipped with a casing made of acid-resisting hard rubber. In addition to these qualities the casing also makes the new pump both heat and distortion resisting. The pump is mounted on the base by means of acid-resisting hard rubber covered casting which acts as a chamber to catch drip from the stuffing box. The motor shaft is extended, tapered and pinned into the pump shaft with all parts interchangeable.

Planes Use Rubber De-Icers

Airplanes used by the United Air Lines, Inc., Chicago, have been equipped with rubber de-icers. These de-icers are actually rubberized shoes, made of tubes of specially knitted fabric covers with high test wax-finished rubber. These "shoes" are placed on the wings and tail surfaces of the planes with air being pumped into them by the pilot whenever ice forms on these surfaces. As the "shoes" inflate and deflate any formed ice is cracked and brushed off the plane. The leading edges of the stabilizer and the fin of the plane are fitted with rubber patches containing two tubes which are alternately inflated. The pumping action is controlled by one of the plane's motors. The de-icers for United Air Lines were produced by the B. F. Goodrich Company, Akron.

Panco Sta-Tite Rubber Heels

The Panther-Panco Rubber Company, Inc., of Chelsea, Massachusetts, is featuring a line of rubber heels under the trade name of Panco Sta-Tite Heels, which, because of unique construction, are claimed

by the company to possess wearing thickness double that of the ordinary heel. Concave in shape, these heels have a steel wire mesh embedded in the heel base. This wire mesh holds the nail-heads firmly and exerts its pressure to the entire outer edge of the heel.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, FEBRUARY 9, 1935

Crude Rubber

SEVERAL disturbing factors interrupted the steady climb of crude rubber prices last month. These included the heavy increase of stocks, failure of several English brokerage houses, and the indecision of the U. S. Supreme Court to render a decision on the "Gold Clause." From a price of 13.71 on the Exchange on January 9 the price dropped steadily to 12.38 on January 29 for spot rubber. Since the first of this month it has resumed its climb, closing at 13.15 on February 9. Decision of the Supreme Court is expected to jump the price substantially. The futures market was also adversely affected. December, 1935, deliveries reached a high of 14.83 on January 7, touched a low of 13.14 on January 29, and closed stronger at 14.02 on February 9. Quotations in the outside market, Exchange, London and Singapore, follow:

As of February 9

Plantations—			
Ribbed Smoked Sheets—			
Spot	—	@	.13⅛
February	—	@	.13⅛
Apr.-June	—	@	.13⅛
First Latex, crepe spot	—	@	.13½
Amber Crepe, No. 2	—	@	.11½
Amber Crepe, No. 3	—	@	.11⅜
Amber Crepe, No. 4	—	@	.11¼
Brown Crepe, clean thin	—	@	.11½
Brown Crepe, rolled	—	@	.11⅜
Latex—			
Liquid Latex, per gal	.54	@	.55
Paras—			
Up-River, fine	—	@	.09¾
Acre Bolivian, fine	—	@	.10
Balata—			
Block, Ciudad	—	@	.33

LONDON MARKET

Standard Smoked Sheets—Buyers—Feb. 9			
February	—	@	6 7/32d
Apr.-June	—	@	6 7/32d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Feb. 9			
February	—	@	6 3/32d
Apr.-June	—	@	6 5/32d

Reclaimed Rubber

Reclaimers report better than average shipments with a slight let-up in production, after an active January. At present prices, reclaims are a good "buy" and a number of manufacturers are taking advantage of this fact by increasing their use of reclaims. Greatly improved conditions are expected with a large volume turnover during the first six months of the current year. Prices are unchanged since our last report.

High Tensile			
Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼
Shoe			
Unwashed	.06½	@	.06¾
Washed	.08	@	.09
Tube			
No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07½	@	.07¾
Tires			
Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09¼	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼
Miscellaneous			
Mechanical blends	.04¼	@	.04½

Scrap Rubber

Conditions in the scrap rubber market are quiet with little demand from reclaimers in the East. Exports for 1934 were 51,498,409 pounds, an increase of more than 2,500,000 pounds over 1933. Prices are firm with increases expected shortly. Quotations are unchanged since last month, as follows:

(Prices to Consumers)

Auto tire peelings	ton 17.00	@	19.00
Mixed auto	ton 7.50	@	8.50
Clean solid truck tires	ton 35.00	@	37.50
Boots and shoes	ton 20.00	@	21.50
Arctics, untrimmed	ton 17.50	@	18.50
Inner tubes, No. 1	lb. .07	@	.07½
Inner tubes, No. 2	lb. .03½	@	.03⅝
Inner tubes, Red	lb. .02½	@	.02¾

Cotton

After reaching a high of 12.90 for spot on January 8 cotton prices started to decline several points daily until a low of 12.45 was touched on February 2. The awaited decision of the Supreme Court on the status of gold, which will affect all foreign markets, was responsible in greater part for this decline. Scattered liquidation of stocks brought about by the delayed decision also tended to keep prices on a downward trend. Prices have strengthened in the last few days by reason of mills entering the market to purchase small quantities. The cotton goods trade is of the belief that once the Supreme Court renders a decision cloth business will improve considerably since there is a large accumulation of demand. Foreign spinners are reported to be using more American cotton than is being exported with port and mill stocks running to much below normal. This is another encouraging factor. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Jan. 8	February 9		
	Close	High	Low	Close
February	....	12.34	12.34	12.34
March	12.69	12.42	12.37	12.38
May	12.78	12.47	12.43	12.44

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb. .36	@	.36½
Peeler, carded, 23/4/3	lb. .37	@	.37½
Peeler, carded, 15/3/3	lb. .34	@	.34½
Peeler, carded, 13/3/3	lb. .33	@	.33½
Egyptian, carded, 23/5/3	lb. .48½	@	.49
Egyptian, combed, 23/5/3	lb. .52½	@	.53
CHAFERS			
Carded, American, 1 1/16"	lb. .36½	@	.37
Carded, American, 1"	lb. .31	@	.33
LENO BREAKER			
Carded, American, 1 1/16"	lb. .36½	@	.37½
Carded, American, 1"	lb. .31	@	.33

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	—	@ .05¾
40x40	36 in.	6.15	lb.	—	@ .05⅞
40x36	36 in.	6.50	lb.	—	@ .04⅞
48x48	40 in.	2.50	lb.	—	@ .11¼
48x48	40 in.	2.85	lb.	—	@ .09⅞
64x68	40 in.	3.15	lb.	—	@ .10¼
56x60	40 in.	3.60	lb.	—	@ .08¾
48x44	40 in.	3.75	lb.	—	@ .08⅛
44x40	40 in.	4.25	lb.	—	@ .07¼

Ducks

Enameling	lb. .32	@	.37½
Belting and Hose	lb. .34	@	—
Single filling, A grade	lb. .16¾	@	.17¼
Double filling	lb. .17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM JANUARY 9 TO FEBRUARY 9

Date	Spot	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Sales
Jan. 9	13.60	13.59	13.70	13.80	13.89	13.99	14.10	14.21	14.30	14.40	14.50	14.60	14.70	——	196
10	13.61	13.63	13.73	13.84	13.93	14.02	14.12	14.22	14.33	14.43	14.53	14.63	14.73	——	96
11	13.38	13.39	13.49	13.60	13.69	13.79	13.89	14.00	14.10	14.21	14.31	14.41	14.51	——	286
12	13.30	13.29	13.39	13.50	13.58	13.66	13.75	13.85	13.96	14.07	14.17	14.27	14.37	——	222
13															
14	13.18	13.16	13.29	13.40	13.48	13.57	13.66	13.76	13.86	13.96	14.05	14.14	14.23	——	238
15	12.95	12.93	13.02	13.10	13.14	13.18	13.27	13.36	13.44	13.52	13.58	13.64	13.70	——	1195
16	13.06	13.04	13.11	13.19	13.26	13.34	13.43	13.53	13.61	13.69	13.77	13.86	13.95	——	609
17	13.10	13.08	13.15	13.23	13.30	13.37	13.46	13.55	13.62	13.70	13.80	13.90	14.00	——	362
18	13.00	13.00	13.07	13.15	13.22	13.29	13.38	13.47	13.56	13.65	13.75	13.85	13.95	——	167
19	13.04	13.05	13.12	13.17	13.25	13.33	13.42	13.52	13.62	13.72	13.81	13.90	13.99	——	85
20															
21	12.96	12.96	13.03	13.11	13.17	13.23	13.32	13.41	13.50	13.59	13.69	13.80	13.91	——	200
22	12.90	12.90	12.97	13.05	13.12	13.19	13.26	13.34	13.44	13.54	13.63	13.72	13.81	——	210
23	12.84	12.84	12.89	12.94	13.00	13.07	13.14	13.22	13.31	13.41	13.50	13.59	13.68	——	240
24	12.88	12.75	12.82	12.90	12.97	13.05	13.11	13.17	13.27	13.37	13.40	13.49	13.58	——	206
25	12.75	12.72	12.79	12.87	12.95	13.03	13.10	13.17	13.26	13.36	13.40	13.49	13.59	——	275
26	12.56	12.56	12.63	12.71	12.78	12.85	12.93	13.01	13.09	13.17	13.22	13.31	13.40	——	187
27															
28	12.58	12.60	12.58	12.59	12.67	12.75	12.82	12.89	12.98	13.07	13.17	13.27	13.37	——	709
29	12.38	12.48	12.40	12.47	12.56	12.65	12.71	12.77	12.82	12.90	12.98	13.06	13.14	——	488
30	12.62	12.71	12.63	12.70	12.77	12.85	12.92	13.01	13.08	13.15	13.24	13.33	13.43	——	444
31	12.62	——	12.67	12.74	12.80	12.88	12.94	13.01	13.10	13.19	13.27	13.35	13.43	——	270
Feb. 1	12.62	——	12.65	12.72	12.80	12.88	12.94	13.00	13.07	13.15	13.23	13.31	13.38	13.46	205
2	12.67	——	12.70	12.74	12.82	12.90	12.96	13.02	13.09	13.16	13.25	13.34	13.43	13.52	115
3															
4	12.68	——	12.69	12.76	12.82	12.89	12.95	13.02	13.11	13.21	13.30	13.39	13.48	13.57	122
5	12.70	——	12.71	12.78	12.85	12.93	12.99	13.06	13.14	13.23	13.31	13.40	13.49	13.58	229
6	12.60	——	12.61	12.68	12.76	12.85	12.91	12.97	13.06	13.15	13.23	13.32	13.41	13.50	177
7	12.65	——	12.68	12.75	12.81	12.88	12.95	13.03	13.09	13.17	13.24	13.33	13.42	13.51	344
8	13.05	——	13.05	13.12	13.17	13.23	13.32	13.41	13.48	13.55	13.64	13.73	13.83	13.93	354
9	13.15	——	13.13	13.20	13.29	13.38	13.45	13.52	13.60	13.68	13.78	13.85	13.93	14.02	221

Rubber CHEMICAL Markets

NEW YORK, FEBRUARY 11, 1935

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.21	@	.25
A-5-10	lb.	.33	@	.36
A-7	lb.	.53	@	.65
A-11	lb.	.60	@	.75
A-16	lb.	.55	@	.65
A-19	lb.	.56	@	.75
A-32	lb.	.70	@	.80
A-17	lb.	—	@	—
Aldehyde ammonia, crystals	lb.	.65	@	.67
Altax	lb.	—	@	—
Captax	lb.			
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.47
Diphenylguanidine	lb.	.35	@	.37
Ethylidene aniline	lb.	.45	@	.47½
Formaldenyde aniline	lb.	.37½	@	.42
Guantal	lb.	.42	@	.51
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.37	@	—
Lead Oleate, No. 999	lb.	.11	@	—
Witco	lb.	.11	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Phenex	lb.	.50	@	.55
Pipsolene	lb.	3.55	@	4.00
R & H 40	lb.	.40	@	.41
R & H 50	lb.	.40	@	.41
R-2	lb.	1.55	@	1.90
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.			
No. 2	lb.			
Thiocarbanilid, drums	lb.	.21	@	.25
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.60
Tuads	lb.			
Ureka	lb.	.62	@	1.00
Ureka B	lb.	—	@	—
Ureka C	lb.	.58	@	.69
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z-88-P	lb.	.48	@	.60
Zimate	lb.			
Inorganic				
Litharge, domestic	lb.	.06½	@	—
Magnesia, calcined, heavy	ton	60.00	@	65.00

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.36	@	.38
Ultramarine	lb.	.12	@	.15
Browns				
Sienna, Italian	lb.	.06	@	'13
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome, light	lb.	.20	@	.30
medium	lb.	.21	@	.31
dark	lb.	.24	@	.30
Chromium Oxide, bbl.	lb.	.22	@	.23
Reds				
Antimony				
crimson, 15/7	lb.	.46	@	—
sulfur, free	lb.	.48	@	.52
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone CB, No. 21	lb.	.06	@	.06¼
Cryptone, No. 19	lb.	.06	@	.06¼
Lithopone				
Albalith, black label—11	lb.	.04½	@	.04¾
Azolith	lb.	.04½	@	.04¾
Rayox	lb.			
Titanium oxide	lb.	.17	@	.19
Titanox B	lb.	.06	@	.06½
Titanox C	lb.	.06	@	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.11	@	.11¼
XX—86 Zinc Sulphide, bbls.	lb.	.11	@	.11¼
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06½	@	.06¾
ZZ (leaded)	lb.	.06¾	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06½	@	.06¾
XX Red—4	lb.	.06½	@	.06¾
XX Red—72	lb.	.06½	@	.06¾
XX Red—78	lb.	.06½	@	.06¾
XX Red—103	lb.	.06½	@	.06¾
U. S. P.—X, bbls.	lb.	.06½	@	.06¾
Kadox, black label—15	lb.	.12½	@	.12¾
Blue label—16	lb.	.09¾	@	.09¾
Red label—17	lb.	.08¾	@	.08¾
St. Joe, black label	lb.	.07	@	.07¼
green label	lb.	.06½	@	.06¾
red label	lb	.06½	@	.06¾
Zinc Oxide—French Process				
Anaconda, lead free	lb.	.06½	@	.06¾
Anaconda, selected lead free	lb.	.06¾	@	.07
Florence White seal—7 bbls.	lb.	—	@	.10½
Green seal—8	lb.	.09¾	@	.09¾
Red seal—9	lb.	.08¾	@	.08¾
Yellows				
Chrome	lb.	.15	@	.16
Ocher, dom. med.	lb.	.01½	@	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535	@	.0825
Bone, powdered	lb.	.05½	@	.12½
Carbon, compressed	lb.	.0535	@	.0825
uncompressed	lb.	.0535	@	.0825
"Certified," Cabot	lb.	.0535	@	.0825
Spherons	lb.	.0535	@	.0825
"Disperso"	lb.	.0535	@	.0825
Drop, bbls.	lb.	.05½	@	.14
"Excello," compressed	lb.	.0535	@	.0825
"Fumonex"	lb.	.03	@	.07
"Gastex"	lb.	.03	@	.07
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.0535	@	.0825
"Supreme"	lb.	.0535	@	.0825
Thermatomic—"P 33"	lb.	—	@	—
"Thermax"	lb.	—	@	—
United "Dixie" & "Kosmos"	lb.	.0535	@	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	14.00	@	15.00
Barium carbonate (98-100%)	ton	56.50	@	61.50
Barium Dust	lb.	.05	@	.06
Barytes	ton	22.00	@	24.00
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	70.00	@	75.00
Calcene	ton	35.00	@	43.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	60.00	@	75.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	7.50	@	10.00
Congaree	ton	9.00	@	—
Dark Blue Ridge	ton			
Dixie	ton			
Dixie, Jr.	ton			
Lexington	ton	10.00	@	22.00
McNamee	ton			
Par	ton			
Tensulite	ton			
Witco		15.00	@	—
Cotton Flock	ton	8.50	@	9.00
Glues, extra white	lb.	.10½	@	.18
medium white	lb.	.28	@	.30
Kalite No. 1	lb.	.14	@	.19
Kalite No. 3	ton	30.00	@	55.00
Magnesium carbonate	ton	40.00	@	65.00
Mica	lb.	.08	@	—
Rottenstone (powdered)	ton	65.00	@	80.00
Soapstone, powdered	lb.	.02½	@	.05
Starch, powdered	ton	16.00	@	22.00
Talc, domestic	cwt.	3.56	@	3.76
Pyrax A	ton	12.00	@	15.00
Whiting, commercial	ton			
English Cliffstone	ton	17.00	@	18.00
Sussex	ton	33.00	@	43.00
Witco	ton			
Wood Flour	ton	15.00	@	—
Zinc Carbonate	lb.	18.00	@	30.00
Zinc Stearate	lb.	.10½	@	.11
		.19	@	.21

MINERAL RUBBER

Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton			
Parmr, solid	ton	21.00	@	26.00
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

WETTING AGENTS

Arkesklene	lb.	—	@	—

SPECIALTIES

Aromatics—Rodo	lb.			
Para-Dors No. 5145	lb.	2.00	@	—
Sunproof	lb.	.35	@	.37½
Sponge Paste	lb.	—	@	.80
Tonox	lb.	.56	@	.60

SOFTENERS

Acids				
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Tartaric, crystals	lb	.26	@	—
Acids, Fatty				
Laurex	lb.	.15	@	.16
Stearex	lb.	.08½	@	.13
Stearic, double pressed	lb.	.09	@	.14
Alkalies				
Caustic Soda, 76%	cwt.	3.60	@	3.75
Soda Ash, 58% C.L.	cwt.	2.52	@	—
Oils				
Corn, refined, bbls.	lb.	.08½	@	.08¾
Cottonseed, crude	gal.	—	@	.04
Cycline Oil	gal.	.15	@	.28
Degras (c.l. 100 bbls.)	lb.	.02¾	@	—
Less c.l. (10-25 bbls.)	lb.	.03	@	—
Lots less than 10 bbls.	lb.	.03¼	@	—
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.03½	@	.03¾
Niger	lb.	.03¼	@	.03½
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.02	@	.02½
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22	@	.23½
Pine, steam distilled	gal.	.64	@	.65
dest. dist., drums	gal.	.40	@	.45
Rosin Oil, cmpd.	gal.	.40	@	—
Rubtack	lb.	.40	@	—
Seedine, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.05	@	—
Witco Softener (f.o.b. wks.)	gal.	.15	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05	@	.06
coal tar	gal.	.05½	@	.06
hardwood	ton	20.00	@	25.00
pine, 200 lb. gr. wt.	bbl.	6.00	@	—
Rosin, grade K, 280 lb.	bbl.	5.85	@	—
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22	@	.23½
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	bbl.	12.00	@	13.00
Solvents				
Acetone, pure	lb.	.12½	@	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.30½	@	.35½
Benzene, 90%	gal.	—	@	.19
Beta-Trichlorethane	gal.	—	@	—
Bondogen	lb.	—	@	—
Carbon, bisulfide	lb.	.05½	@	.06
Carbon, tetrachloride	lb.	.05	@	.05¼
Dichlorethylene	lb.	.29	@	—
Dipentene, cml., drums	gal.	.40	@	.41
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05½	@	.06½
Gasoline, steel bbls.	gal.	.16	@	—
Naphtha, solvent	gal.	.26	@	.31
Plastogen	lb.			
Reogen	lb.			
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.46½	@	.50½
dest. dist., drums	gal.	.39	@	.41
Waxes				
Beeswax, white	lb.	.34	@	.37
Carnauba, yellow	lb.	.37	@	.40
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.10	@	.11
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.03¼	@	—
White crude scale 124/126	lb.	.03¼	@	—
Refined, 125/127	lb.	.04¼	@	—

ANTI-OXIDANTS

AgeRite, Gel	lb.			
HP	lb.			
Powder	lb.			
Resin	lb.			
White	lb.			
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Flectol-H	lb.	—	@	—
Flectol White	lb.	—	@	—
Flectol B	lb.	—	@	—
Neozone	lb.			
Oxynone	lb.	.66	@	.90
Retardex	lb.	.35	@	.40
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.60

MOLD LUBRICANTS

Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Rusco, f.o.b. Nitro	lb.	.12	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08
Zip (Mold Wash)	lb.	—	@	—

FACTICE

Amberex	lb.	.13¼	@	—
Black	lb.	.08½	@	—
White	lb.			
Brown	lb.	.08	@	.12
Duphax	lb.	.07	@	.11¼

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.04	@	.04½
Sulfur flour.				
Refined, 100% pure (bags)	cwt.	3.45	@	—
Commercial (bags)	cwt.	1.95	@	2.80
Telloy	lb.			
Vandex	lb.			

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	10.06	23,848	5,770,109	11.23	425,615
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,210	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1933:								
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	25.	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	51	9,422	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503
Nov.	—	—	60	20,169	332	60,904	887	296,447
Dec.	—	—	6	2,458	192	31,947	581	184,588

(1) Weight given in pounds of dry rubber contained in latex

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	40,609
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	47,097
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	25,928	44,947
May	34,592	37,333	49,233	39,386	37,817	30,957	44,074	43,012
June	33,801	37,676	43,227	34,195	37,916	41,475	50,743*	40,241
July	29,219	37,407	41,526	29,508	31,397	29,976	49,614*	32,647
Aug.	33,460	42,927	38,274	30,850	27,586	23,721	44,428*	33,310
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,281*	30,352
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,543*	31,347
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	28,831*	34,842
Dec.	25,492	31,232	25,531	21,687	21,409	18,015	28,757*	36,662
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	400,545*	455,479

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,753	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption	% to Crude	Stocks*
1925	132,930	137,105	35.6	13,203
1926	180,582	164,500	45.9	23,213
1927	189,144	178,471	47.6	24,980
1928	208,516	223,000	50.4	24,785
1929	218,954	226,588	48.4	27,464
1930	157,967	153,497	40.8	22,000
1931	133,351	124,126	33.9	19,257
1932	75,608	77,504	23.4	16,354
1933	99,560	81,602	19.9	20,746
1934	110,010	100,597	22.3	23,079
1933:				
Jan.	5,301	4,811	21.0	16,262
Feb.	4,578	4,363	20.2	16,570
Mar.	3,847	3,454	19.1	15,496
Apr.	4,617	4,407	13.1	14,370
May	8,366	7,770	17.4	13,734
June	10,591	9,674	19.1	13,231
July	12,049	10,317	20.8	a 14,108
Aug.	11,708	9,446	21.2	a 15,037
Sept.	10,435	7,862	22.3	a 15,869
Oct.	9,466	7,212	22.9	a 17,748
Nov.	9,063	6,335	21.9	a 19,170
Dec.	9,539	5,951	20.7	a 20,746
1934:				
Jan.	9,828	7,000	17.3	24,263
Feb.	9,504	7,646	18.8	23,356
Mar.	11,479	9,683	20.6	25,113
Apr.	10,185	9,387	20.9	22,033
May	10,848	9,500	22.1	22,887
June	10,820	9,459	23.5	23,664
July	9,446	8,175	25.0	24,926
Aug.	8,160	8,493	25.5	24,607
Sept.	6,974	7,028	23.2	24,540
Oct.	8,145	8,167	26.1	24,511
Nov.	7,268	7,775	22.3	23,999
Dec.	7,353	8,284	22.6	23,079

* Stocks on hand at the end of month or year.
a Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933*	1934		1932	1933*	1934
January	26,038	26,397	29,416	August	35,706	37,400	38,933
February	25,378	23,320	25,048	September	33,828	34,580	34,877
March	29,597	28,123	30,528	October	32,680	33,022	37,544
April	31,234	29,791	32,735	November	29,895	30,312	34,839
May	32,016	33,709	38,141	December	27,110	28,572	30,517
June	39,489	37,699	36,296				
July	30,929	34,087	37,393	Total	373,900	377,003*	406,267

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
November	3 1/16	3 1/16	3 1/16	3 1/16																												3 1/16
December	3 1/16	3 1/16	3 1/16																													3 1/16
1933																																
January			3 1/16	3 1/16	3 1/16	3 1/16	3 1/16		3 1/16	3 1/16	3 1/16	3 1/16	3 1/16	3 1/16			3 1/16	2 15/16		3	3											
February			2 15/16	2 15/16		3	2 15/16		3	3	3		2 15/16	3		3	2 15/16	3		3	2 15/16		3 1/16								
March			3																													3
April		4 1/16	3 1/16	3	3 1/16	3 1/16	3 1/16	3 1/16		3 1/16	3 1/16	3 1/16			4 1/16	4 1/16	3 15/16	3 15/16	4 1/16	4	3 15/16	3 3/4	4 1/16	4 1/16	4 1/16	4 1/16		4 1/16	4 1/16			3 1/16
May		4 1/16	4 1/16		4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	5 1/16	4 1/16	5 1/16	5 1/16	5 1/16	5 1/16		5 1/16	5 1/16			5
June		6 1/16	6 1/16		6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16	6 1/16		6 1/16	6 1/16			6 1/16
July		7 1/16	8		7 1/16	7	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	8 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7	7 1/16	7 1/16
August		7 1/16	7 1/16	8	7 1/16	7 1/16	8	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16
September		7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16	7 1/16
October		7 1/16	7 1/16	8	8 1/16	8	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16
November		7 1/16	7 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16
December		9 1/16		9 1/16	9 1/16		9 1/16		8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16
1934																																
January		9	8 11/16	9	9	9 1/16	10 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	8 1/16	10 1/16	9 1/16	9 1/16	8 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16	9 1/16
February		9 1/16	9 11/16		10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	11 1/16	10 1/16	11 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16
March		10 1/16	10 15/16		11 1/16	10 15/16	11 1/16	10 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16
April		11 1/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 1/16	11 1/16	11 1/16	11 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
May		14 1/16	13	12 3/4	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
June		14 1/16	15		14 1/16	14 1/16	14 1/16	15 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	15 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16
July		15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16
August		14 1/16	14 1/16		15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16
September		14 1/16	13 1/16		15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16	15 1/16
October		14 1/16	13 1/16	14	13 1/16	13 1/16	13 1/16	14	13 1/16	13 1/16	14 1/16	14 1/16	14 1/16	14 1/16	13 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	14 1/16	13	14 1/16	14 1/16
November		13 1/16	13 1/16	13	13	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	12 15/16	12 15/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	12 15/16	12 15/16	12 15/16	12 15/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16
December		13 1/16	12 1/16																													13
1935																																
January		13 1/16	13 1/16	13 1/16	13 1/16		13 1/16	13 1/16	13 1/16	13 1/16	13 1/16	13 1/16																				
February		12 3/4		12 3/4			12 5/8	13 1/16																								

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	20.14	15.24	8.34	4.38	3.08	9.32	13.10
Feb.	23.97	15.85	7.70	4.03	2.95	10.45	
Mar.	24.55	15.34	7.71	3.35	3.01	11.01	
Apr.	21.18	14.93	6.43	3.02	3.56	12.10	
May	21.46	14.24	6.49	3.09	4.95	13.26	
June	20.64	12.45	6.35	2.66	6.15	13.51	
July	21.30	11.24	6.37	2.89	8.01	14.60	
Aug.	20.59	9.96	5.38	3.63	7.31	15.47	
Sept.	20.37	8.28	5.08	3.84	7.30	15.36	
Oct.	19.67	8.20	4.87	3.65	7.64	13.96	
Nov.	16.62	9.01	4.65	3.44	8.66	13.04	
Dec.	16.12	9.05	4.64	3.24	8.87	12.98	
Average for Year	20.55	11.98	6.17	3.49	5.96	12.92	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Nov.	Dec.	Jan.	Feb.	Day	Nov.	Dec.	Jan.	Feb.
1	6 1/4	6 3/8	—	6 1/8	17	6 7/16	6 5/16	6 7/16	
2	6 5/16	—	6 3/8	6 1/8	18	—	6 1/4	6 3/8	
3	6 3/8	6 7/16	6 5/16	—	19	6 3/8	6 1/4	6 7/16	
4	—	6 7/16	6 5/8	6 7/16	20	6 3/8	6 1/4	—	
5	6 7/16	6 7/16	6 5/8	6 7/16	21	6 7/16	6 7/16	6 3/8	
6	6 3/8	6 3/8	—	6 7/16	22	6 7/16	—	6 5/16	
7	6 3/8	6 7/16	6 5/8	6 7/16	23	6 7/16	—	6 1/4	
8	6 7/16	6 3/8	6 1/8	7 3/8	24	6 1/4	—	6 1/4	
9	6 5/16	—	6 5/8		25	—	—	6 1/4	
10	6 7/16	6 5/16	6 5/8		26	6 5/16	—	6 7/16	
11	—	6 1/4	6 5/16		27	6 3/8	6 5/16	—	
12	—	6 1/4	6 7/16		28	6 3/8	6 7/16	6 5/8	
13	6 3/8	6 5/16	—		29	—	6 1/4	6 5/16	
14	6 1/4	6 7/16	6 5/16		30	6 7/16	—	6 1/2	
15	6 5/16	6 7/16	6 1/2		31	—	6 3/8	6 7/16	
16	6 1/4	—	6 3/8						

Average Monthly Price Per Pound

Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence	Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Jan.	3.052	2.264	4.429	6.434	Aug.	2.654	3.811	7.401	
Feb.	2.760	2.093	4.920		Sept.	2.485	3.728	7.409	
Mar.	2.047	2.099	5.136		Oct.	2.425	3.957	6.806	
Apr.	1.876	2.323	5.712		Nov.	2.518	4.096	6.294	
May	1.825	2.966	6.207		Dec.	2.444	4.200	6.295	
June	1.750	3.392	6.245		Average for Year	2.434	3.233	6.159	
July	1.875	3.860	7.053						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Dec.	Jan.	Feb.	Date	Dec.	Jan.	Feb.	Date	Dec.	Jan.	Feb.
1	12.75	—	12.55	11	12.80	12.70		21	12.75	12.70	
2	—	12.85	12.45	12	12.80	12.65		22	12.80	12.65	
3	12.65	12.85	—	13	12.75	—		23	—	12.65	
4	12.65	12.85	12.50	14	12.80	12.65		24	12.80	12.65	
5	12.80	12.75	12.55	15	12.80	12.55		25	—	12.65	
6	12.70	—	12.50	16	—	12.60		26	12.75	12.65	
7	12.70	12.85	12.55	17	12.70	12.75		27	12.75	—	
8	12.70	12.90	12.65	18	12.75	12.60		28	12.85	12.60	
9	—	12.85		19	12.75	12.65		29	12.85	12.55	
10	12.75	12.80		20	12.75	—		30	—	12.60	
								31	12.85	12.60	

Average Monthly Price Per Pound

	1932 Cents	1933 Cents	1934 Cents	1935 Cents		1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	6.65	6.23	11.25	12.70	Aug.	7.43	9.55	13.40	
Feb.	6.85	6.05	12.28		Sept.	6.30	9.64	13.00	
Mar.	6.86	6.39	12.30		Oct.	6.30	9.58	12.48	
Apr.	6.16	7.02	11.80		Nov.	6.22	10.04	12.53	
May	5.72	8.64	11.44		Dec.	6.00	10.17	12.76	
June	5.02	9.47	12.20		Average for Year	6.41	8.63	12.36	
July	5.87	10.76	12.84						

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1932	ON HAND 1933	ON HAND 1934	AFLOAT 1932	AFLOAT 1933	AFLOAT 1934	ON HAND AND AFLOAT 1932	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794	357,094	51,728	32,898	53,063	370,604	414,692	410,157
Mar.	329,586	390,135	353,242	44,190	29,531	54,722	373,776	419,666	405,786
Apr.	336,957	382,167	351,981	40,387	30,745	56,251	377,344	412,912	408,232
May	336,719	364,623	351,329	50,453	43,342	57,921	387,172	407,965	409,250
June	334,657	333,954	358,149	43,079	63,608	46,698	377,736	397,562	404,847
July	333,729	326,609	364,883	37,894	57,435	45,869	371,623	384,044	410,752
Aug.	342,888	325,148	362,647	42,846	53,084	40,278	385,734	378,232	402,925
Sept.	346,154	334,637	359,667	46,188	57,255	38,831	342,892	391,982	398,498
Oct.	358,282	343,579	362,018	40,176	58,568	38,247	398,458	402,147	400,265
Nov.	360,386	353,852	361,236	40,879	57,140	38,625	401,265	410,992	399,861
Dec.	379,000	364,541	352,632	38,360	55,606	47,644	417,360	419,147	400,276

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	50,490
Feb.	65,942	37,182	38,752	Aug.	47,079	39,480	48,953
Mar.	64,280	40,689	40,501	Sept.	44,942	39,237	56,103
Apr.	61,848	40,911	42,413	Oct.	42,327	37,101	63,079
May	56,089	41,998	42,190	Nov.	40,606	36,139	67,656
June	51,009	43,032	45,674	Dec.	37,407	35,615	72,285

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
Aug.	50,860	51,555	51,640	51,362	
Sept.	48,255	50,028	52,320	53,924	56,030
Oct.	57,272	59,469	61,043	62,058	
Nov.	64,232	65,728	67,109	67,088	
Dec.	67,901	69,337	70,256	71,849	72,314
1935					
Jan.	73,407	75,821	78,138	79,530	

Stocks in Liverpool

1934					
Aug.	55,467	55,681	55,757	56,343	
Sept.	56,383	58,006	58,182	59,028	57,477
Oct.	54,944	55,266	57,414	57,944	
Nov.	58,380	59,616	60,281	60,543	
Dec.	60,164	60,125	62,243	62,573	62,617
1935					
Jan.	63,132	65,099	65,977	65,768	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	65,099
Feb.	49,283	46,954	21,530	41,884	Aug.	48,971	20,649	38,601	59,227
Mar.	49,590	46,591	24,594	47,933	Sept.	47,025	20,415	36,948	54,905
Apr.	45,868	39,663	25,460	48,431	Oct.	52,132	23,158	37,282	54,155
May	44,278	38,690	29,822	76,393	Nov.	46,947	25,419	39,018	49,282
June	47,517	19,770	34,676	73,218	Dec.	45,795	25,341	38,269	51,255

STOCKS IN OTHER CENTRES

End of: 1933	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Nov.	36,965	38,530	1,285	5,575	3,383
Dec.	38,441	36,700	1,052	5,792	2,981
Jan., 1934	36,788	39,250	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,430	1,263	4,683	3,094
August	30,507	36,060	1,322	5,713	2,849
Sept.	33,661	39,630	1,290	5,137	3,075
Oct.	31,762	40,560	1,401	5,675	3,113
Nov.	33,590	40,000	1,404	5,631	3,081
Dec.	23,173	45,000	1,326		

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	
1935:		1934:		1934:	
January	1,868,723	May	1,140,132	September	526,472
February		June	1,015,730	October	629,878
March		July	1,155,024	November	577,713
April		August	752,074	December	1,199,240

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory[2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994	3,533	2,655	4,707	4,308	6,659	7,070	8,697
Sept.	2,539	3,999	2,936	3,082	3,503	3,183	6,096	7,595	8,419
Oct.	2,569	3,249	3,287	1,799	2,537	3,010	6,876	8,462	8,657
Nov.	2,304	3,039	3,341	1,711	2,197	3,191	7,454	9,247	8,779
Dec.	1,983	3,082		1,819	3,531		7,644	8,888	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory[2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916	3,680	2,503	4,687	4,198	6,127	6,628	7,555
Sept.	2,601	3,827	3,110	3,098	3,472	3,024	5,753	7,008	7,639
Oct.	2,187	3,506	3,219	1,658	2,676	2,689	6,214	7,831	8,151
Nov.	2,005	2,863	3,169	1,578	2,103	2,767	6,662	8,625	8,503
Dec.	1,779	2,631		1,724	3,410		6,749	7,815	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,778,739	2,190,099	588,640	116,890	92,538	24,352	2,895,629
1933*							
Nov.*	60,683	42,365	18,318	2,291	1,503	788	62,974
Dec.*	80,565	50,789	29,776	3,262	2,171	1,091	83,827
1934							
Jan.*	156,907	113,652	43,255	6,904	4,946	1,958	163,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,525	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August*	234,810	183,500	51,310	9,904	7,325	2,579	244,714
Sept.*	168,871	123,909	44,962	5,579	4,211	1,368	174,450
Oct.*	132,491	84,503	47,988	3,780	2,125	1,655	136,271
Nov.*	78,465	45,556	32,909	1,697	1,052	645	80,162
Dec.	183,187	128,059	55,128	2,732	2,334	398	185,919

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons

	BRITISH MALAYA [1]								DUTCH EAST INDIES [5]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,677	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1933:															
Jan.	46,662	7,857	38,805	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	212	65,037
Feb.	37,621	6,167	31,454	5,064	304	541	458	268	4,895	5,119	6,081	895	620	227	55,926
March	42,153	7,964	34,189	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	103	61,573
April	36,823	7,758	29,065	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	183	56,564
May	42,917	13,664	29,253	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	143	66,111
June	41,482	16,538	24,944	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	124	63,864
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	166	73,983
Aug.	52,436	17,869	34,567	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	323	75,114
Sept.	49,607	15,146	34,461	5,111	125	1,027	727	611	5,868	9,164	15,005	1,702	656	274	74,731
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,426	965	314	85,131
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,303	6,684	9,951	14,474	1,553	956	366	78,127
Dec.	57,579	18,110	39,469	7,435	964	989	750	1,046	7,030	10,183	17,274	3,779	930	302	90,151
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	200*	76,542
Dec.	59,575	15,375	44,200	8,481		1,237	680	2,043	10,865	12,953	12,354	2,956		200*	

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,883	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,496	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,245	7,831	5,520	10,402	.....
1933:															
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,282
Aug.	43,208	4,330	5,251	4,193	1,795	4,424	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	149	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296		798	693	447	813	675	254	
Nov.	35,982	15,875	3,176	3,425	1,568	5,580			516	379	187	1,382		215	
Dec.	17,305	15,816													

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
The RUBBER SERVICE Laboratories Co.
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IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

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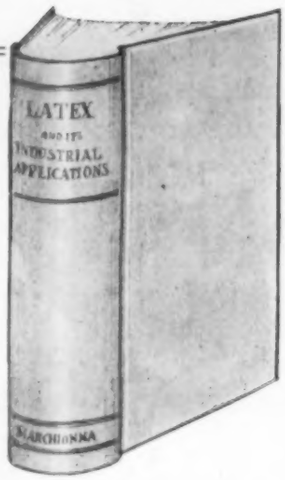

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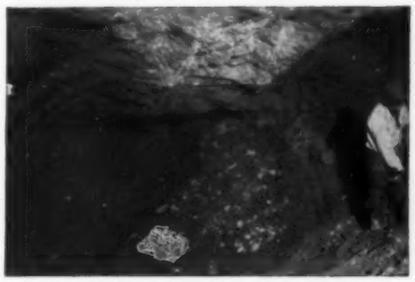

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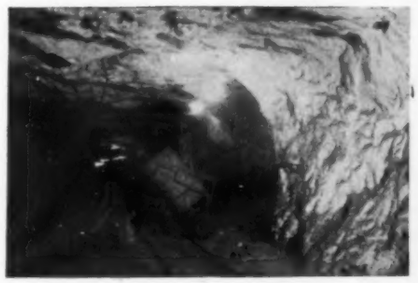

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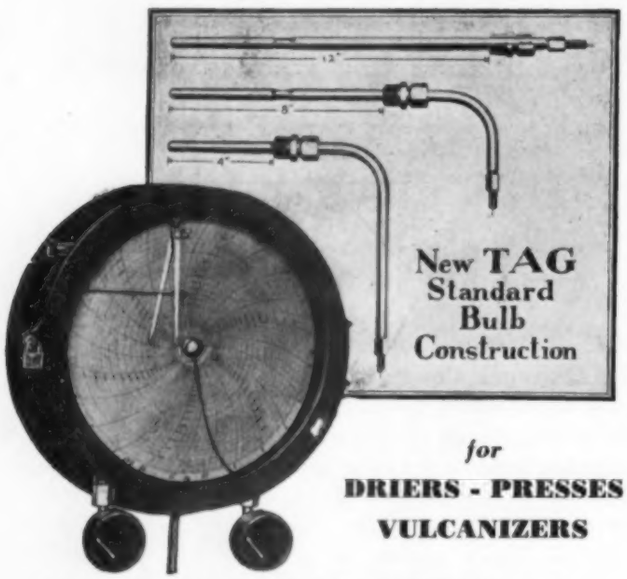

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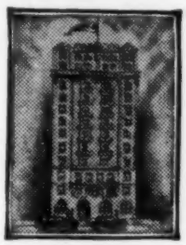

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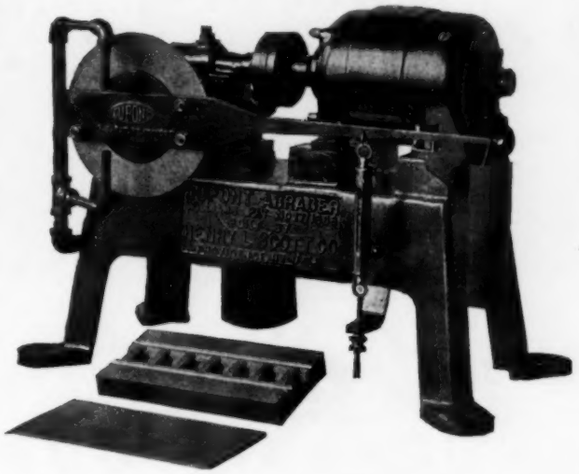

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